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## **APPENDIX E:**

Archaeological Literature Review and Field  
Inspection for the Proposed Lease for the  
Nāhiku, Ke‘anae, Honomanū, and Huelo  
License Areas

Cultural Surveys Hawai‘i, Inc.





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**Archaeological Literature Review and Field Inspection for  
the Proposed Lease (Water Lease) for the Nāhiku, Ke‘anae,  
Honomanū, and Huelo License Areas (East Maui Aqueduct  
System), Multiple Ahupua‘a, Makawao and Hāna District,  
Maui Island**

**TMKs: [2] 1-1-001:044, 50, 1-1-002:002, 1-2-004:005, 007  
(por.), 2-9-014:001, 005, 011, 012, 017**

**Prepared for  
Wilson Okamoto Corporation**

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(Job Code: MAUI 26)**

**December 2018**

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## Management Summary

<b>Reference</b>	Archaeological Literature Review and Field Inspection for the Proposed Lease (Water Lease) for the Nāhiku, Ke‘anae, Honomanū, and Huelo License Areas (East Maui Aqueduct System), Multiple Ahupua‘a, Makawao and Hāna District, Maui Island, TMKs: [2] 1-1-001:044, 50, 1-1-002:002, 1-2-004:005, 007 (por.), 2-9-014:001, 005, 011, 012, 017 (Yucha et al. 2018)
<b>Date</b>	December 2018
<b>Project Number</b>	Cultural Surveys Hawai‘i, Inc. (CSH) Job Code: MAUI 26
<b>Investigation Permit Number</b>	CSH completed the fieldwork component of this study under archaeological fieldwork permit number 18-15, issued by the Hawai‘i State Historic Preservation Division (SHPD) per Hawai‘i Administrative Rules (HAR) §13-13-282.
<b>Agencies</b>	Department of Land and Natural Resources (DLNR)
<b>Land Jurisdiction</b>	State of Hawai‘i
<b>Project Proponent</b>	Alexander & Baldwin (A&B) / East Maui Irrigation Company, Limited (EMI), collectively referred to as “A&B”
<b>Project Funding</b>	Private; A&B
<b>Project Location</b>	The proposed Water Lease includes the Nāhiku, Ke‘anae, Honomanū, and Huelo license areas (herein referred to as “License Area”) within the State of Hawai‘i Forest Reserve on the northern slope of Haleakalā. The License Area includes portions of the modern judicial districts of Makawao and Hāna, the traditional <i>moku</i> of Hāmākua Loa and Ko‘olau, and numerous <i>ahupua‘a</i> . The License Area is depicted on portions of the 1992a Haiku, 1992c Keanae, 1991 Kilohana, 1992d Nahiku, and 1992b Hana U.S. Geological Survey (USGS) 7.5-minute topographic quadrangles.
<b>Project Description</b>	The Proposed Action constitutes the issuance of one long-term (30 years) Water Lease from the Board of Land and Natural Resources (BLNR) for the continued “ <i>right, privilege, and authority to enter and go upon</i> ” the License Area for the “ <i>purpose of developing, diverting, transporting, and using government owned waters</i> ” through the existing EMI Aqueduct System which supplies water to domestic and agricultural water users. The Water Lease will enable the lessee to continue to go on lands owned by the State in order to maintain and repair existing access roads and trails used as part of the EMI Aqueduct System. It will allow continued operation of the EMI Aqueduct System to deliver water to the Maui County Department of Water Supply (MDWS) for domestic and agricultural

	water needs in Upcountry Maui, including agricultural users at the Kula Agricultural Park (KAP), as well as the Nāhiku community. It also will allow for the continued provision of water to approximately 30,000 acres of agricultural lands in Central Maui.
<b>Project Acreage</b>	The License Area encompasses a total of approximately 33,000 acres (13,355 hectares).
<b>Document Purpose</b>	<p>A Chapter 6E-7 and 6E-42 historic preservation review letter dated 25 January 2017 (Log No. 2017.00026; Doc. No. 1701GC08) sent from the SHPD to the DLNR Land Division requested that, pursuant to HAR §13-284-5(b)(5)(A and C), an archaeological inventory survey (AIS) and architectural inventory survey would be required prior to issuance of the lease and that these surveys also be preceded by inventory plans.</p> <p>Additional information regarding the lease was provided to the SHPD including the understanding that the proposed water lease will not involve any ground disturbance and that the potential impact of flooding from abandoning the diversion on five streams will not be greater than periodic naturally occurring events. A subsequent Chapter 6E-8 historic preservation review letter (Log No. 2017.00026; Doc. No. 1706MBF11) sent from the SHPD to the DLNR Land Division updated the previous correspondence to no longer request the completion of an AIS plan or AIS in the project area in conjunction with the proposed lease.</p> <p>This investigation was designed to determine the likelihood that historic properties (any building, structure, object, district, area, or site over 50 years old) may be affected by the project and, based on findings, consider cultural resource management recommendations. This document is intended to facilitate the project's planning and support the project's environmental review compliance. This investigation does not fulfill the requirements of an AIS investigation, per HAR §13-13-276.</p>
<b>Fieldwork Effort</b>	Fieldwork was conducted between 15 and 18 May 2018 by Trevor Yucha, B.S. (project manager), Nicole Ishihara, B.A., Jonas Madeus, B.A., Aulii Mitchell, M.A., and Zachariah Royalty, B.S., under the general supervision of Hallett H. Hammatt, Ph.D. This work required approximately 16 person-days to complete.
<b>Consultation</b>	As part of the project, CSH has completed a cultural impact assessment that included consultation with Native Hawaiian Organizations, agencies, groups, and community members in East, Central, and Upcountry Maui.
<b>Analysis and Recommendations</b>	<b>Proposed Action:</b> The Proposed Action will not include partial or total destruction or alteration of historic properties, detrimental

	<p>alteration of the surrounding environment, detrimental visual, spatial, noise or atmospheric impingement, increasing access with chance of resulting damage, nor neglect resulting in deterioration or destruction. The Proposed Action does not include project-related ground disturbance or changes in water flow greater than periodic natural stream freshets. As such, the Proposed Action will have no impact to archaeological historic properties.</p> <p><b>No Action Alternative:</b> If the No Action alternative includes the continued maintenance and repair of the existing EMI Aqueduct System regardless of the issuance of the subject Water Lease, then the No Action alternative will not include partial or total destruction or alteration of historic properties, detrimental alteration of the surrounding environment, detrimental visual, spatial, noise or atmospheric impingement, increasing access with chance of resulting damage, nor neglect resulting in deterioration or destruction. Therefore, the No Action alternative with continued maintenance will have no impact to archaeological historic properties.</p> <p>If the No Action alternative does not include continued maintenance and repair of the existing EMI Aqueduct System, then the No Action alternative has the potential to pose an impact to historic properties. Components of the aqueduct system that deteriorate and begin to fail, such as broken ditch walls or collapsed tunnels, have the potential to alter natural drainage patterns and increase erosion in downstream areas that are outside of established stream channels. These areas have the potential to contain surface and subsurface historic properties that could be affected by flooding and erosion. As an architectural resource, the EMI Aqueduct System would also be affected by “neglect resulting in deterioration or destruction” if maintenance and repair of the system are discontinued</p> <p><b>Water Sources Alternative:</b> The construction of new wells, desalinization facilities, and reservoirs is assumed to include some level of project-related ground disturbance on Maui Island. Project-related ground disturbance has the potential to include partial or total destruction or alteration of historic properties, detrimental alteration of the surrounding environment, and/or detrimental visual, spatial, noise or atmospheric impingement. Therefore, the Water Sources alternative has the potential to impact historic properties that may be located within the footprint of new wells, desalinization facilities, and reservoirs. Consultation with the SHPD is recommended in order to determine the appropriate historic preservation requirements for the construction of new wells, desalinization facilities, and reservoirs.</p> <p><b>Water Lease Volume Alternative:</b> A reduction in the volume of water diverted from East Maui streams will not include partial or total</p>
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	<p>destruction or alteration of historic properties, detrimental alteration of the surrounding environment, detrimental visual, spatial, noise or atmospheric impingement, increasing access with chance of resulting damage, nor neglect resulting in deterioration or destruction. As such, the Water Lease Volume alternative will have no impact to archaeological historic properties.</p> <p><b>Lease Terms Alternative:</b> The duration of the Water Lease will not include partial or total destruction or alteration of historic properties, detrimental alteration of the surrounding environment, detrimental visual, spatial, noise or atmospheric impingement, increasing access with chance of resulting damage, nor neglect resulting in deterioration or destruction. As such, the Lease Terms alternative will have no impact to archaeological historic properties.</p> <p><b>Management Alternative:</b> A change in management will not include partial or total destruction or alteration of historic properties, detrimental alteration of the surrounding environment, detrimental visual, spatial, noise or atmospheric impingement, increasing access with chance of resulting damage, nor neglect resulting in deterioration or destruction. As such, the Management alternative will have no impact to archaeological historic properties.</p> <p><b>Public Access:</b> An increase in unmanaged public access to the License Area as part of any proposed project alternative is identified as having the potential to impact historic properties. Potential impacts from unmanaged access could include looting and “rock-robbing” of surface and subsurface historic properties, littering, harvesting of archaeologically-associated flora such as ti (<i>Cordyline fruticosa</i>), trampling or erosion from pedestrian/vehicular access, and unpermitted ground disturbance. Consultation with the SHPD is recommended in order to determine the appropriate historic preservation requirements if project alternatives that present an increase in vehicular/pedestrian traffic or uncontrolled public access within the License Area are selected.</p>
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## Section 1 Introduction

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### 1.1 Project Background

At the request of Wilson Okamoto Corporation, Cultural Surveys Hawai'i, Inc. (CSH) has prepared this archaeological literature review and field inspection report (LRFI) for the Proposed Lease (Water Lease) for the Nāhiku, Ke'anae, Honomanū, and Huelo License Areas (East Maui Aqueduct System), Multiple Ahupua'a, Makawao and Hāna District, Maui Island, TMKs: [2] 1-1-001:044, 50, 1-1-002:002, 1-2-004:005, 007 (por.), 2-9-014:001, 005, 011, 012, 017. The project includes the Nāhiku, Ke'anae, Honomanū, and Huelo license areas (License Area) that are located within State of Hawai'i Forest Reserve on the northern slope of Haleakalā. The License Area includes portions of the modern judicial districts of Makawao and Hāna, the traditional *moku* of Hāmākua Loa and Ko'olau, and numerous *ahupua'a*. The License Area encompasses approximately 33,000 acres (13,355 hectares) of land owned by the State of Hawai'i. The License Area is depicted on portions of the 1992a Haiku, 1992c Keanae, 1991 Kilohana, 1992d Nahiku, and 1992b Hana U.S. Geological Survey (USGS) 7.5-minute topographic quadrangles (Figure 1), tax map plats (Figure 2 through Figure 5), and aerial photographs (Figure 6 through Figure 9).

The Proposed Action constitutes the issuance of one long-term (30 years) Water Lease from the Board of Land and Natural Resources (BLNR) for the continued “*right, privilege, and authority to enter and go upon*” the License Area for the “*purpose of developing, diverting, transporting, and using government owned waters*” through the existing EMI Aqueduct System which supplies water to domestic and agricultural water users. The Water Lease will enable the lessee to continue to go on lands owned by the State in order to maintain and repair existing access roads and trails used as part of the EMI Aqueduct System. It will allow continued operation of the EMI Aqueduct System to deliver water to the County of Maui Department of Water Supply (DWS) for domestic and agricultural water needs in Upcountry Maui, including agricultural users at the Kula Agricultural Park (KAP), as well as the Nāhiku community. It also will allow for the continued provision of water to approximately 30,000 acres of agricultural lands (formerly in sugarcane) in Central Maui.

### 1.2 Document Purpose

A Chapter 6E-7 and 6E-42 historic preservation review letter dated 25 January 2017 (Log No. 2017.00026; Doc. No. 1701GC08; Appendix A) sent from the SHPD to the DLNR Land Division requested that, pursuant to HAR §13-284-5(b)(5)(A and C), an archaeological inventory survey (AIS) and architectural inventory survey would be required prior to issuance of the Water Lease and that these surveys also be preceded by inventory plans.

Additional information regarding the proposed Water Lease was provided to the SHPD including the understanding that the proposed Water Lease will not involve any significant ground disturbance within undisturbed areas. Moreover any streams from which diversions will be removed as a result of the Interim Instream Flow Standard (IIFS) established by the Commission on Water Resource Management will not increase flooding potential beyond periodically occurring natural events. A subsequent Chapter 6E-8 historic preservation review letter (Log No. 2017.00026; Doc. No. 1706MBF11; Appendix A) sent from the SHPD to the DLNR Land Division



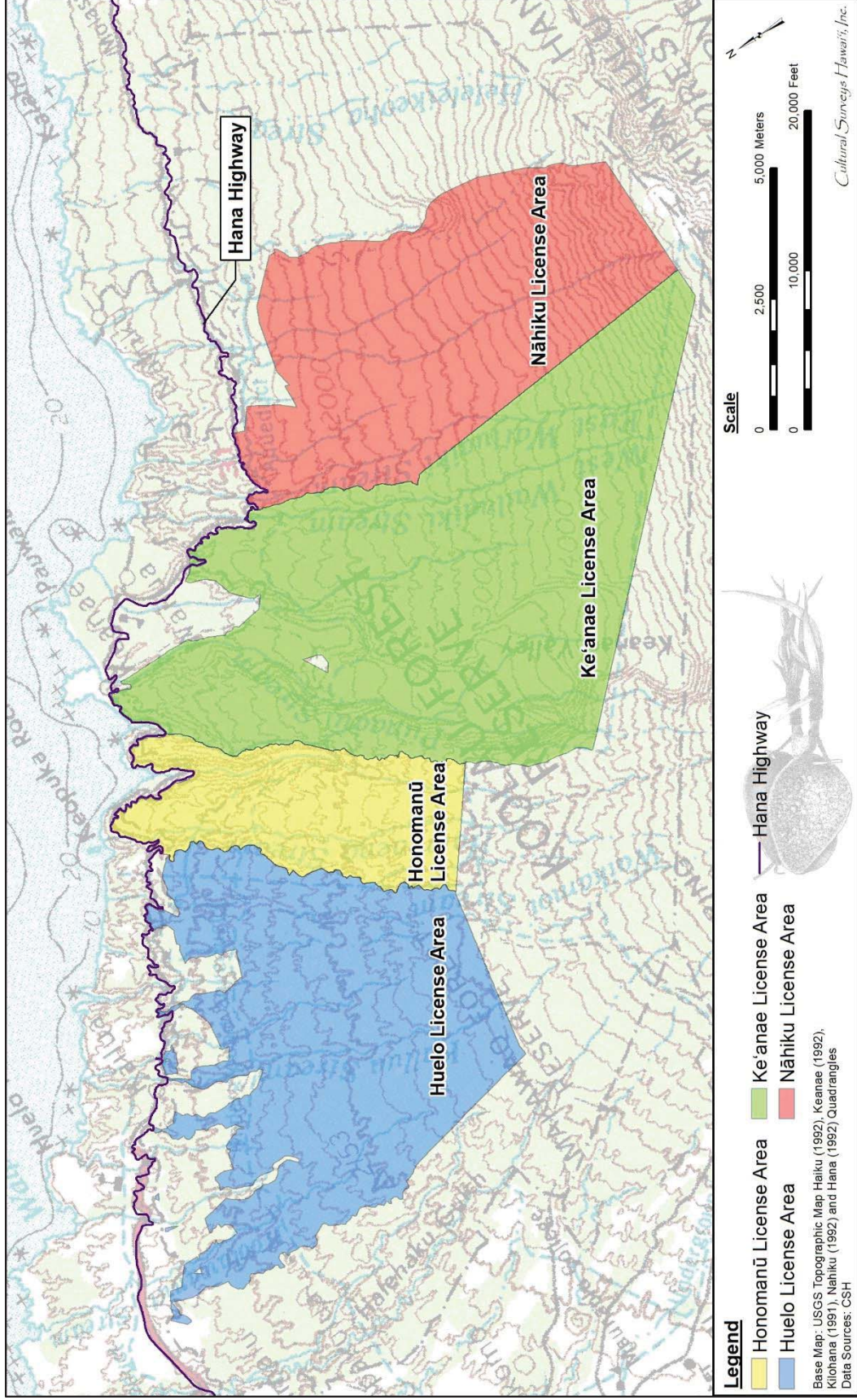


Figure 1. Portions of the 1992a Haiku, 1992c Keanae, 1991 Kilohana, 1992d Nahiku, and 1992b Hana USGS 7.5-minute topographic quadrangles showing the location of the License Area (Nāhiku, Ke'anae, Honomanū, and Huelo License Areas) (U.S. Geological Survey 1991, 1992a, b, c, d)

LRFI for Nāhiku, Ke'anae, Honomanū, and Huelo License Areas, Multiple Ahupua'a, Makawao and Hāna, Maui

TMKs: [2] 1-1 (various plats and parcels), 1-2-004:005, 007 (por.), and 2-9-014:(various parcels)



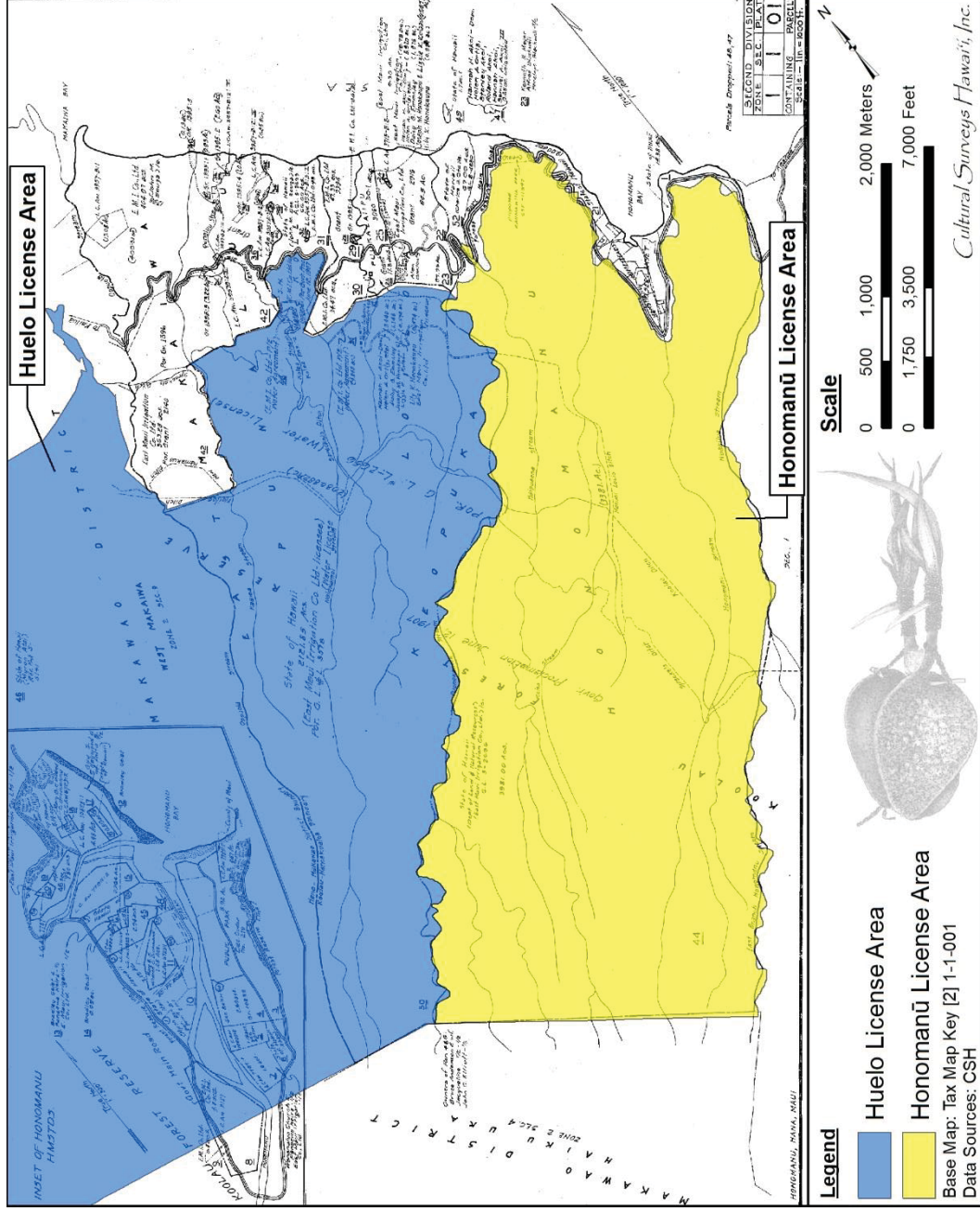


Figure 2. Tax Map Key (TMK): [2] 1-1-001 showing a portion of the Huelo and Honomanu License Areas (Hawaii TMK Service 2014)

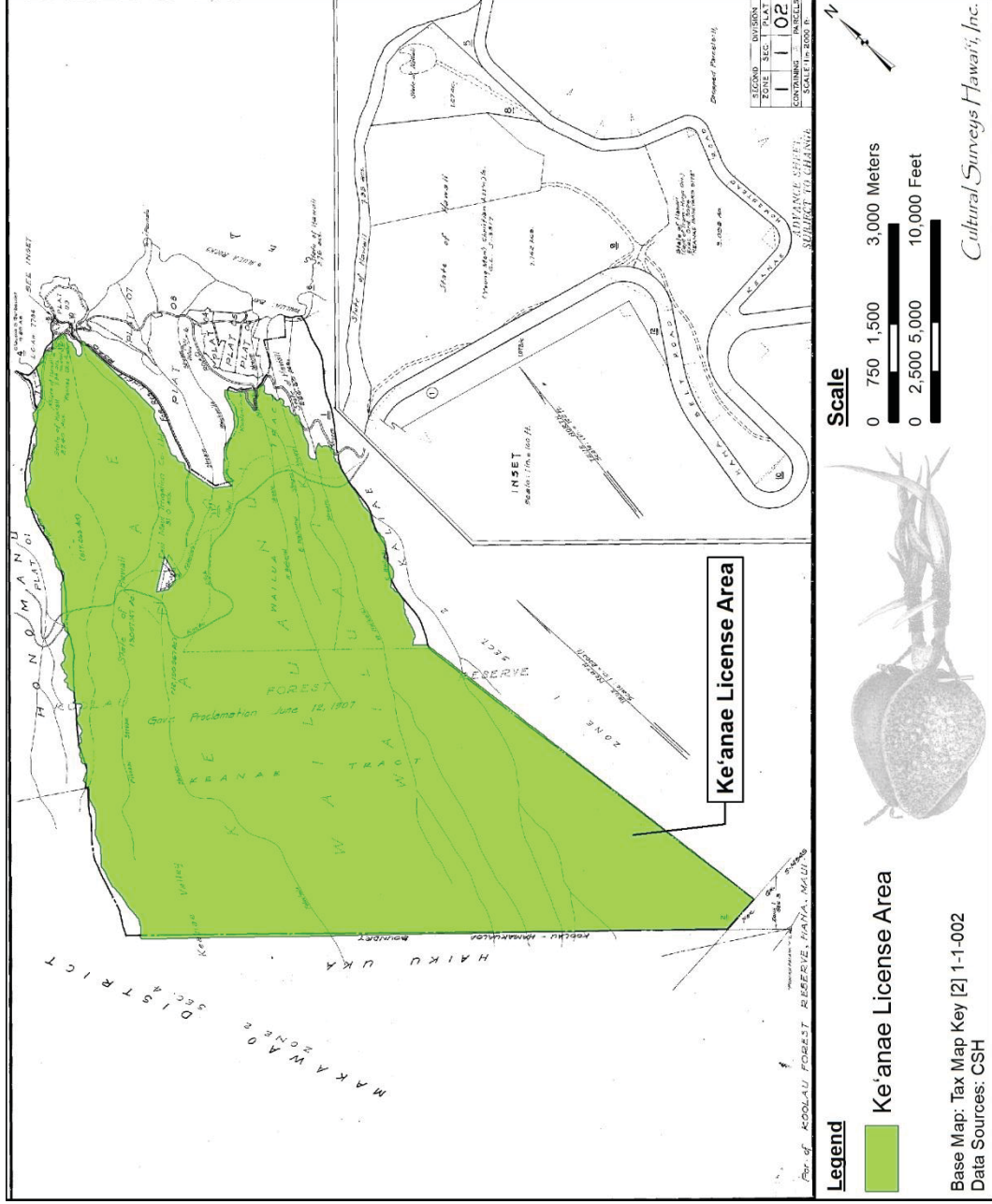


Figure 3. TMK: [2] 1-1-002 showing the Ke'anae License Area (Hawaii TMK Service 2014)

LRFI for Nāhiku, Ke'anae, Honomanū, and Huelo License Areas, Multiple Ahupua'a, Makawao and Hāna, Maui  
TMKs: [2] 1-1 (various plats and parcels), 1-2-004:005, 007 (por.), and 2-9-014:(various parcels)





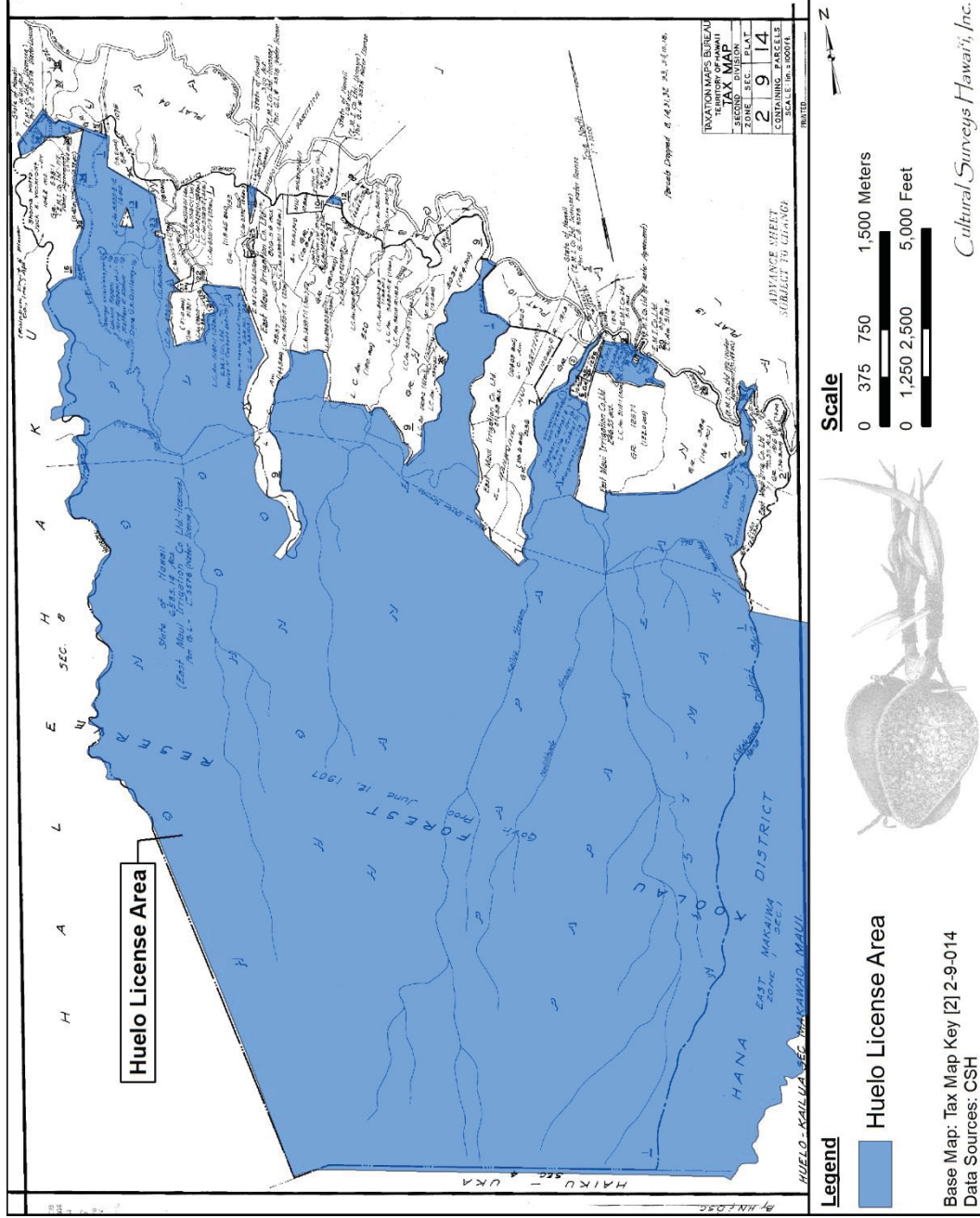


Figure 5. TMK: [2] 2-9-014 showing a portion of the Huelo License Area (Hawaii TMK Service 2014)

LRFI for Nāhiku, Ke‘anae, Honomanū, and Huelo License Areas, Multiple Ahupua‘a, Makawao and Hāna, Maui  
TMKs: [2] 1-1 (various plats and parcels), 1-2-004-005, 007 (por.), and 2-9-014:(various parcels)

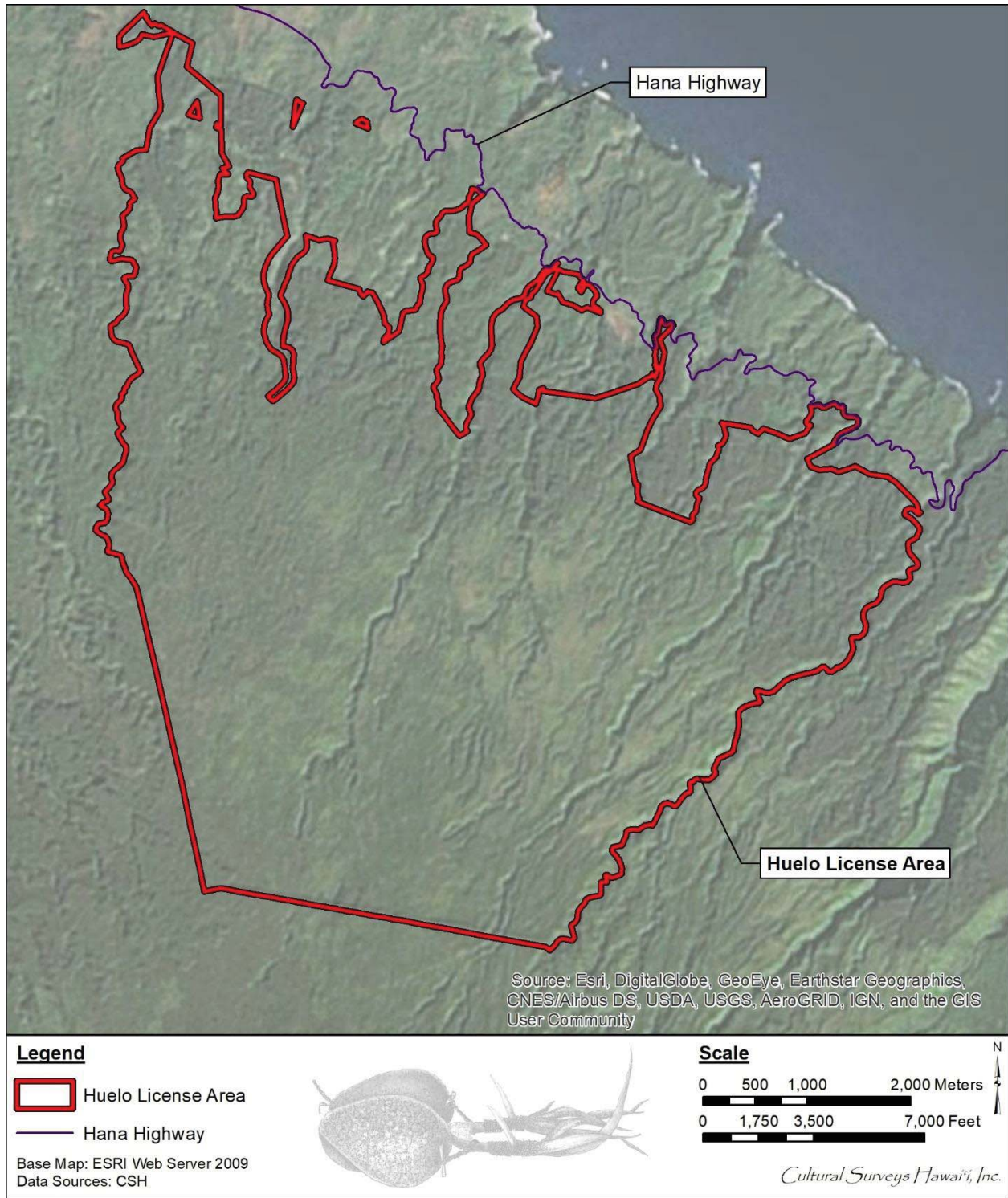


Figure 6. Aerial photograph showing the Huelo License Area (Esri 2009)



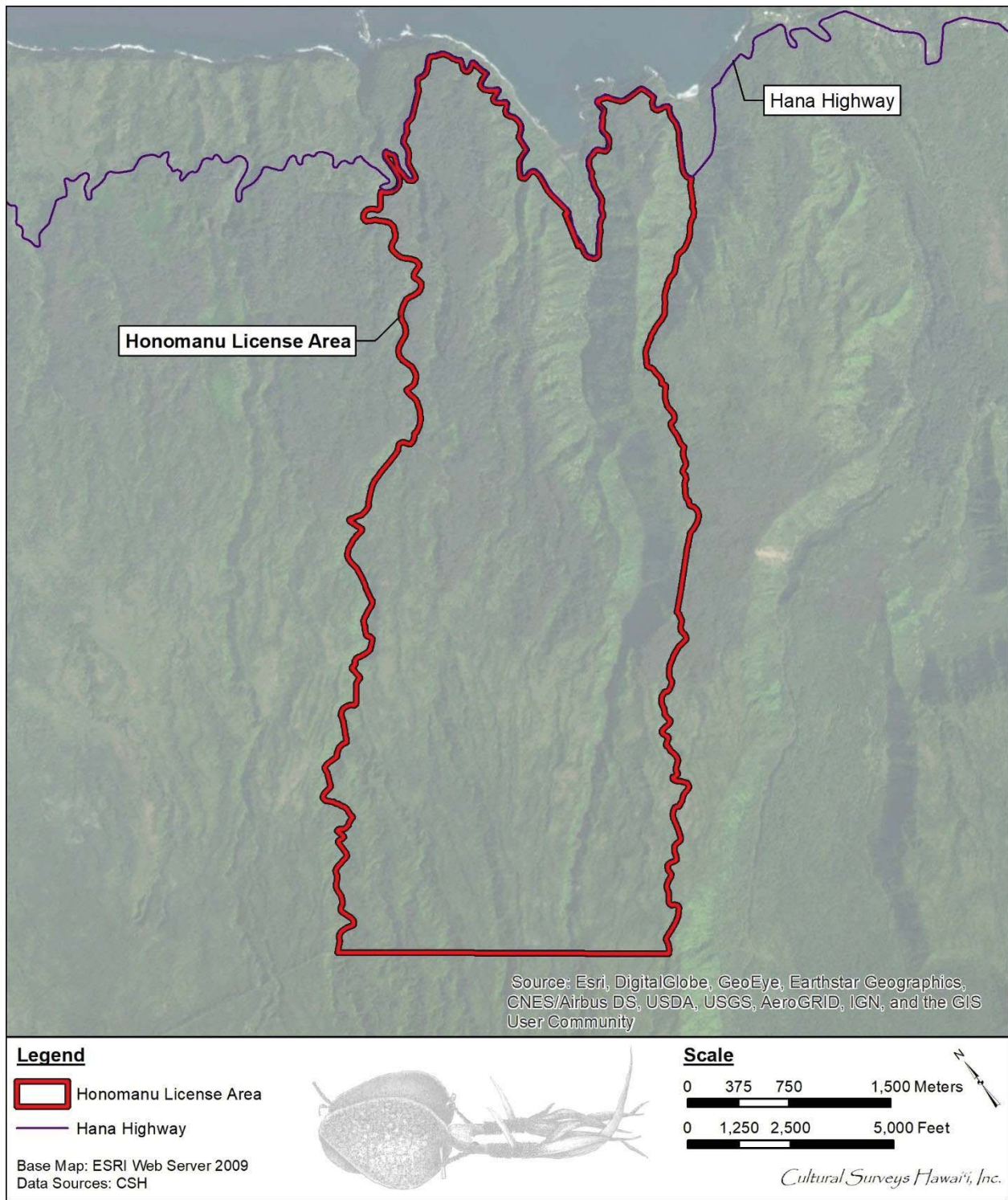


Figure 7. Aerial photograph showing the Honomanū License Area (Esri 2009)

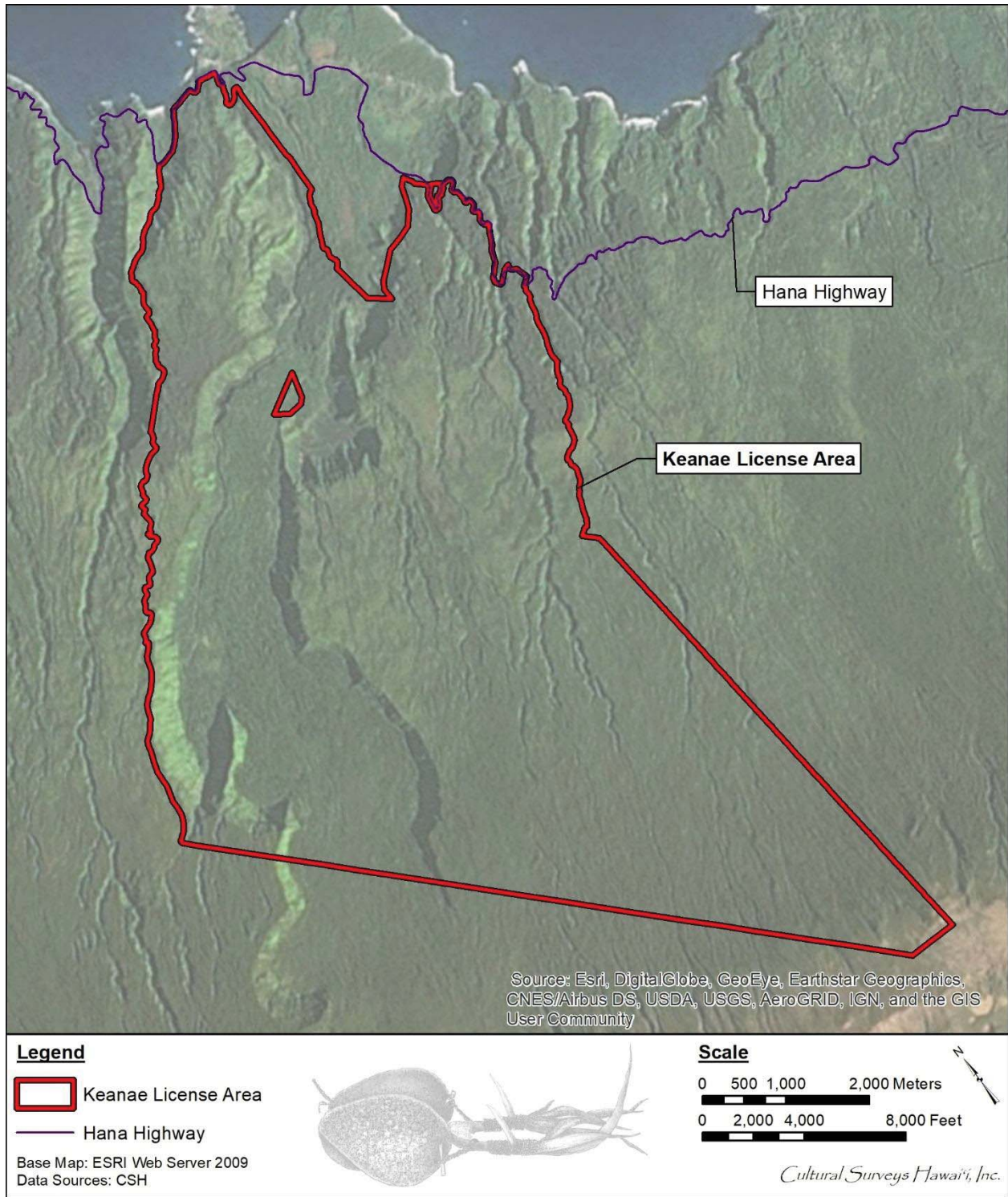


Figure 8. Aerial photograph showing the Ke'anae License Area (Esri 2009)



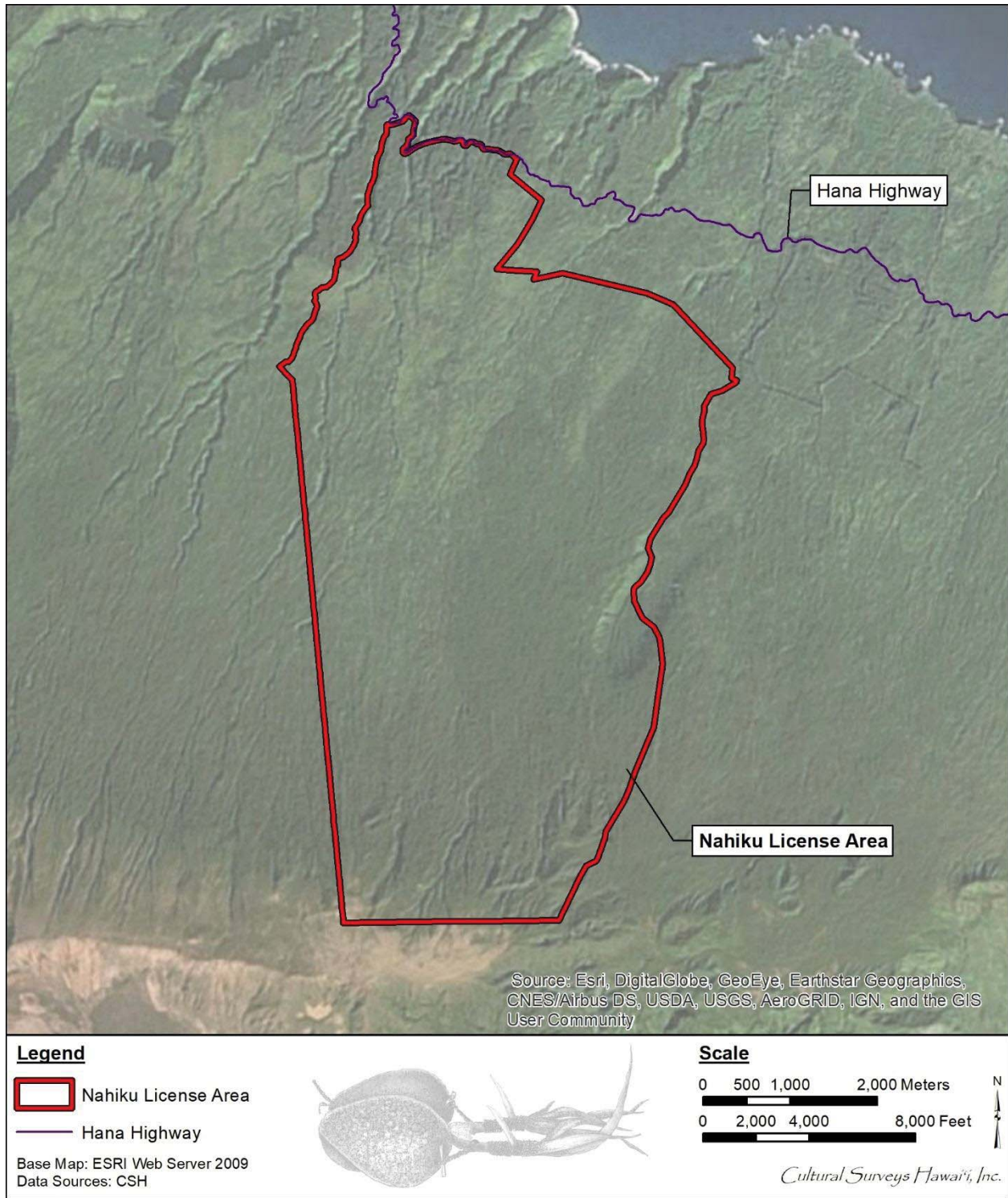


Figure 9. Aerial photograph showing the Nahiku License Area (Esri 2009)

on 6 October 2017 updated the previous correspondence to no longer request the completion of an AIS plan or AIS in the License Area in conjunction with the proposed Water Lease.

This investigation was designed to determine the likelihood that historic properties (any building, structure, object, district, area, or site over 50 years old) may be affected by the project and, based on findings, consider cultural resource management recommendations. This document is intended to facilitate the project's planning and support the project's environmental review compliance. This investigation does not fulfill the requirements of an AIS investigation, per HAR §13-13-276.

## 1.3 Environmental Setting

### 1.3.1 Natural Environment

#### 1.3.1.1 Hydrology

The License Area includes 37 named streams, of which 35 have historically been subject to water diversion into the EMI Aqueduct System. In 2007, all water diversion by A&B of Waiokamilo Stream was terminated and stream flow was fully restored. Presently, full and permanent stream flow restoration is planned for additional streams within the License Area.

#### 1.3.1.2 Rainfall

According to the University of Hawai'i 2011 *Online Rainfall Atlas of Hawaii*, between 1978 and 2007, the annual rainfall along the length of the License Area ranged from approximately 3199.6 mm to 6731.8 mm (approximately 125.97 in to 265.03 in) (Giambelluca et al. 2013). In 2014, the annual average air temperature within the License Area ranged from approximately 15.962 °C to 21.556 °C (approximately 60.73 °F to 70.81 °F) (Giambelluca et al. 2014). The elevation within the project area ranges from approximately 30.48 m to 2286 m (100 ft to 7500 ft) above mean sea level.

#### 1.3.1.3 Vegetation

According to the Terrestrial Flora and Fauna Technical Report for the Proposed East Maui Water Lease (SWCA Environmental Consultants 2018) 19 different vegetation cover types exist within the License Area. Vegetation cover types include Open “*uluhe*” ‘Ōhi‘a Forest (10,934 ac., 33% Lic. Area), Closed ‘Ōhi‘a Forest (8,575 ac., 26% Lic. Area), Alien Forest (7,658 ac., 23% Lic. Area), Closed “*uluhe*” ‘Ōhi‘a Forest (1,527 ac., 5% Lic. Area), Uncharacterized Open-Sparse Vegetation (1,430 ac., 4% Lic. Area), Uluhe Shrubland (658 ac., 2% Lic. Area), Closed “*uluhe*” Koa-‘Ōhi‘a Forest (611 ac., 2% Lic. Area), Uncharacterized Shrubland (579 ac., 2% Lic. Area), Alien Grassland (209 ac., 1% Lic. Area), Uncharacterized Forest (172 ac., 1% Lic. Area), Native Wet Cliff Vegetation (145 ac., < 1% Lic. Area), Closed “native shrub” Koa-‘Ōhi‘a Forest (139 ac., < 1% Lic. Area), Native Shrubland/Sparse “native shrub” ‘Ōhi‘a (82 ac., < 1% Lic. Area), *Deschamsia* Grassland (22 ac., < 1% Lic. Area), Native “alien grasses” Shrubland (22 ac., < 1% Lic. Area), Open “native shrub” ‘Ōhi‘a Forest (10 ac., < 1% Lic. Area), Very Sparse Vegetation to Unvegetated (8 ac., < 1% Lic. Area), Kikuyu Grass Grassland/Pasture (2 ac., < 1% Lic. Area), and Low Intensity Development (1 ac., <1% Lic. Area). These vegetation cover types span a diverse variety of ecosystems and each have their own representative species within each cover type. Generally, each vegetation zone contains a mix of indigenous and introduced species of flora.

There area also 21 endangered or threatened species present within and near the License Areas (SWCA Environmental Consultants 2018:10-11, A-11 through D-12).

#### 1.3.1.4 Soils within Huelo License Area

According to the U.S. Department of Agriculture (USDA) (2001) Soil Survey Geographic (SSURGO) database and soil survey data gathered by Foote et al. (1972), soils within the Huelo License Area portion of the project area include Kailua silty clay (3 to 25 percent slopes) (KBID), Pauwela clay (15 to 25 percent slopes) (PfD), Rough broken land (rRR), Honomanu-Amalu association (rHR), Rough mountainous land (rRT), Amalu peaty silty clay (3 to 20 percent slopes) (rAMD), and water > 40 acres (W) (Figure 10).

Kailua silty clay (3 to 25 percent slopes) (KBID) soils are described as follows:

This soil is on low uplands. Included in mapping were areas of Honomanu and Makawao soils. Also included were small, steep areas near cinder cones.

In a representative profile the surface layer is dark brown silty clay about 9 inches thick. The upper part of the subsoil, about 18 inches thick, is dark-brown and dark reddish-brown silty clay that has subangular blocky structure. The lower part of the subsoil is very dark gray silty clay loam. The substratum is soft, weathered basic igneous rock. The soil is very strongly acid in the surface layer and strongly acid or medium acid in the subsoil.

Permeability is moderately rapid. Runoff is slow, and the erosion hazard is slight. In places roots penetrate to a depth of 4 feet or more...

This soil is used for pasture, woodland, and wildlife habitat. (Capability classification IVe, nonirrigated; pasture group 11; woodland group 8). (Foote et al. 1972:53)

Pauwela clay (15 to 25 percent slopes) (PfD) soils are described as follows:

On this soil runoff is medium and the erosion hazard is moderate. Included in mapping were areas that are steep and moderately eroded. This soil is used for pasture and woodland. (Capability classification IVe, nonirrigated; pineapple group 8; pasture group 8; woodland group 7). (Foote et al. 1972:112)

Rough broken land (rRR) is described as follows:

Rough broken land (rRR) consists of very steep land broken by numerous intermittent drainage channels. In most places, it is not stony. It occurs in gulches and on mountainsides on all the Islands except Oahu. The slope is 40 to 70 percent. Elevations range from nearly sea level to about 8,000 feet. The local relief is generally between 25 and 500 feet. Runoff is rapid, and geologic erosion is active. The annual rainfall amounts to 25 to more than 200 inches.

These soils are variable. They are 20 to more than 60 inches deep over soft, weathered rock. In most places some weathered rock fragments are mixed with the soil material. Small areas of rock outcrop, stones, and soil slips are common. Included in mapping were areas of colluvium and alluvium along gulch bottoms.



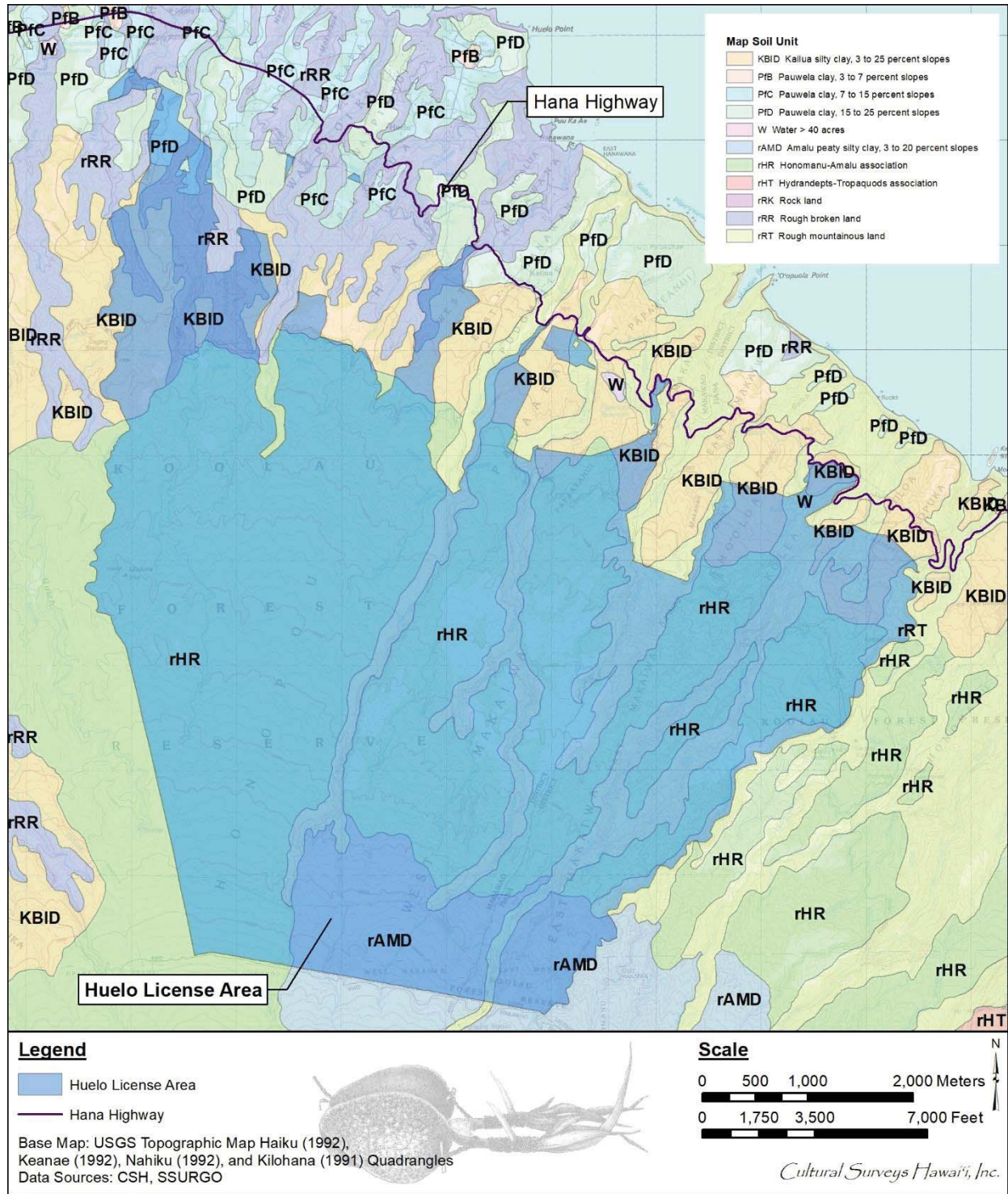


Figure 10. Overlay of *Soil Survey of the State of Hawaii* (Foote et al. 1972), indicating soil types within and surrounding the Huelo License Area (U.S. Department of Agriculture 2001)



This land type is used primarily for watershed and wildlife habitat. In places, it is used also for pasture and woodland. The dominant natural vegetation in the drier areas consists of guava, lantana, natal redtop, bermudagrass, koa haole, and molasses grass. Ohia, kukui, koa, and ferns are dominant in the wetter areas. Puakeawe, aalii, and sweet vernal grass are common at the higher elevations. (Capability classification VIle, nonirrigated). (Foote et al. 1972:119)

Honomanu-Amalu association (rHR) soils are described as follows:

The soils in this association have the profiles described as typical of their respective series. The areas are almost inaccessible by vehicle or on foot. They are on gently sloping to moderately steep, intermediate uplands on East Maui. The Honomanu soils occupy the more sloping, better drained side slopes. The Amalu soils occur on the less sloping tops of ridges and interfluves. The Honomanu soils are well drained; the Amalu soils are poorly drained. Runoff is slow to very slow, and the erosion hazard is slight.

Honomanu soils make up about 60 percent of the association, and Amalu soils about 40 percent. Included in mapping were small areas of Kailua soils and many small, very steep gulches. This association is used for water supply and wildlife habitat. It is covered with dense min forest vegetation. (Honomanu part is in capability classification IVe, nonirrigated; woodland group 8. Amalu part is in capability classification VIIw, nonirrigated). (Foote et al. 1972:43)

Rough mountainous land (rRT) is described as follows:

Rough mountainous land (rRT) occurs in mountainous areas on all islands in the survey area. It consists of very steep land broken by numerous intermittent drainage channels. In most places it is not stony. Elevations range from nearly sea level to more than 6,000 feet. The annual rainfall amounts to 70 to more than 400 inches. Over much of the area, the soil mantle is very thin. It ranges from 1 inch to 10 inches in thickness over saprolite. In most places the saprolite is relatively soft and permeable to roots and water.

The land surface is dominated by deep, V-shaped valleys that have extremely steep side slopes and narrow ridges between the valleys. In most places, the local relief exceeds 500 feet. The soil material on the narrow ridgetops is similar to that of the Amalu and Olokui series. Rock land, rock outcrop, soil slips, and eroded spots make up 20 to 40 percent of the acreage.

This land type is used for water supply, wildlife habitat, and recreation. The natural vegetation consists of ohia, false staghorn fern, tree fern, yellow foxtail, lantana, kukui, and puakeawe. (Capability classification VIlle, nonirrigated) (Foote et al. 1972:119)

Amalu peaty silty clay (3 to 20 percent slopes) (rAMD) soils are described as follows:

This soil is on high ridges and mountaintops. Included in mapping were small areas of Honomanu and Olokui soils and of steep gulches. In a representative profile an organic layer of black peat, about 8 inches thick, overlies a layer of gray massive

clay about 8 inches thick. The substratum is soft, weathered basic igneous rock capped by a horizontal ironstone sheet 1/8 to 1 inch thick. The soil is extremely acid above the ironstone layer.

Permeability is restricted by the ironstone sheet, which is impermeable except for cracks. Runoff is very slow, and the erosion hazard is no more than slight. Roots penetrate to a depth of 8 to 15 inches in places...

This soil is used for water supply and wildlife habitat. (Capability classification VIIw, nonirrigated; woodland group 16). (Foote et al. 1972:28)

### 1.3.1.5 Soils within Honomanū License Area

According to the U.S. Department of Agriculture (2001) Soil Survey Geographic (SSURGO) database and soil survey data gathered by Foote et al. (1972), soils within the Honomanū License Area portion of the project area include Kailua silty clay (3 to 25 percent slopes) (KBID), Stony alluvial land (rSM), Honomanu-Amalu association (rHR), Rough mountainous land (rRT), and Amalu peaty silty clay (3 to 20 percent slopes) (rAMD) (Figure 11).

Stony alluvial land (rSM) soils are described as follows:

Stony alluvial land (rSM) consists of stones, boulders, and soil deposited by streams along the bottoms of gulches and on alluvial fans. In most places, the slope is 3 to 15 percent. Elevations range from nearly sea level to 1,000 feet. The annual rainfall amounts to 15 to 200 inches.

This land type is suited to pasture in the dry areas and to pasture and woodland in the wet areas. The natural vegetation consists of kiawe, klu, ilima, piligrass, and lantana in the dry areas and guava, kukui, hilograss, and Christmas berry in the wet areas. Improvement of this land is difficult because of the stones and boulders. (Capability classification VIIs, nonirrigated). (Foote et al. 1972:120)

### 1.3.1.6 Soils within Ke‘anae License Area

According to the U.S. Department of Agriculture (2001) Soil Survey Geographic (SSURGO) database and soil survey data gathered by Foote et al. (1972), soils within the Ke‘anae License Area portion of the project area consist of Kailua silty clay (3 to 25 percent slopes) (KBID), Stony alluvial land (rSM), Honolua silty clay (7 to 15 percent slopes) (HwC), Honomanu-Amalu association (rHR), Rough mountainous land (rRT), Honomanu silty clay (5 to 25 percent slopes) (rHOD), and Hydrandeps-Tropaquods association (rHT) (Figure 12).

Honolua silty clay (7 to 15 percent slopes) (HwC) is described as follows:

This soil is on smooth interfluves on uplands. Included in mapping were small areas of Alaeloa and Olelo soils. Also included were small, gently sloping areas and small, eroded spots.

In a representative profile, the surface layer is dark-brown silty clay about 12 inches thick. The subsoil, about 58 inches thick, is dark reddish-brown and reddish-brown silty clay that has subangular blocky structure. The substratum is soft, weathered basic igneous rock. The soil is strongly acid in the surface layer and subsoil.

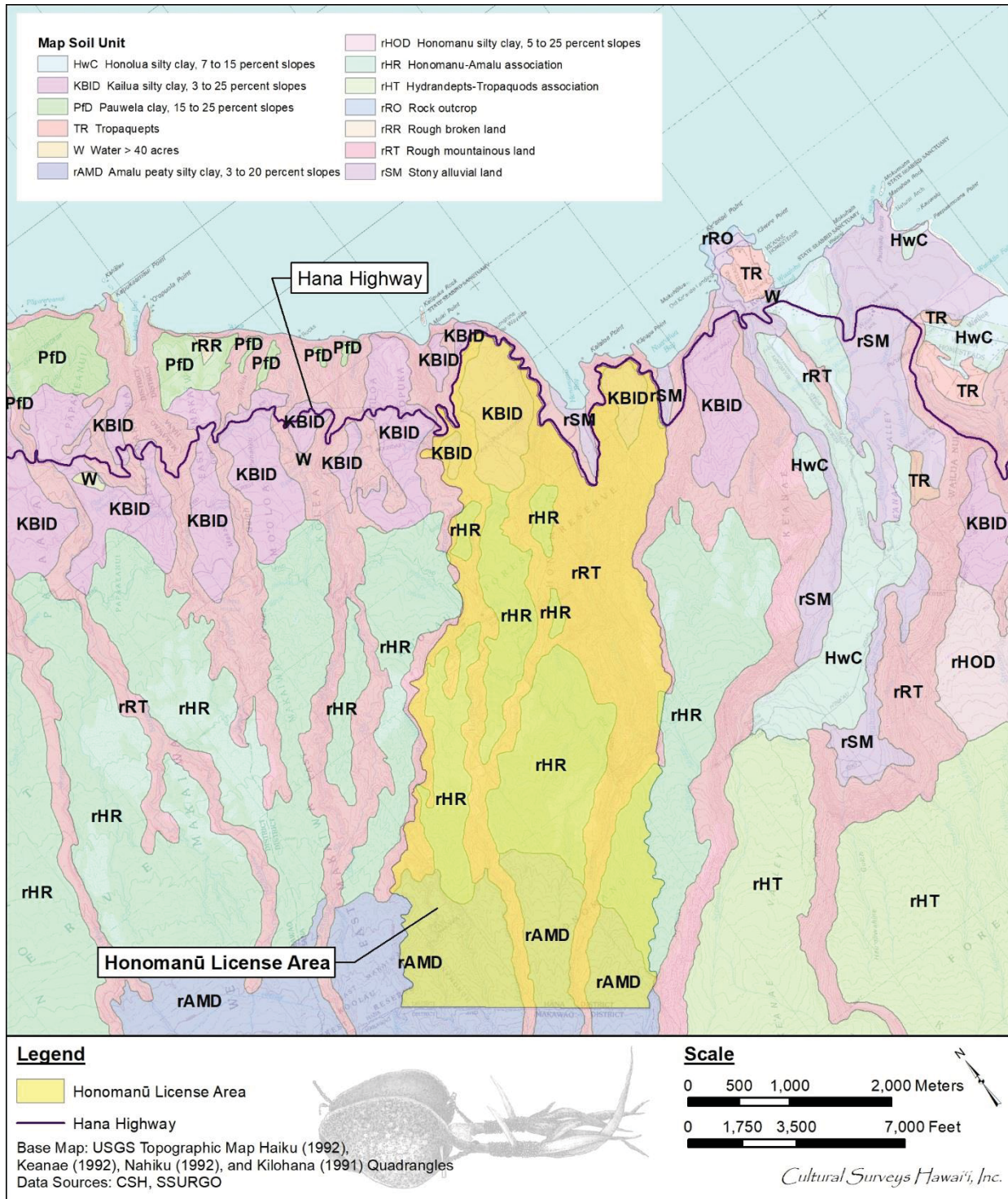


Figure 11. Overlay of *Soil Survey of the State of Hawaii* (Foote et al. 1972), indicating soil types within and surrounding the Honomanu License Area (U.S. Department of Agriculture 2001)



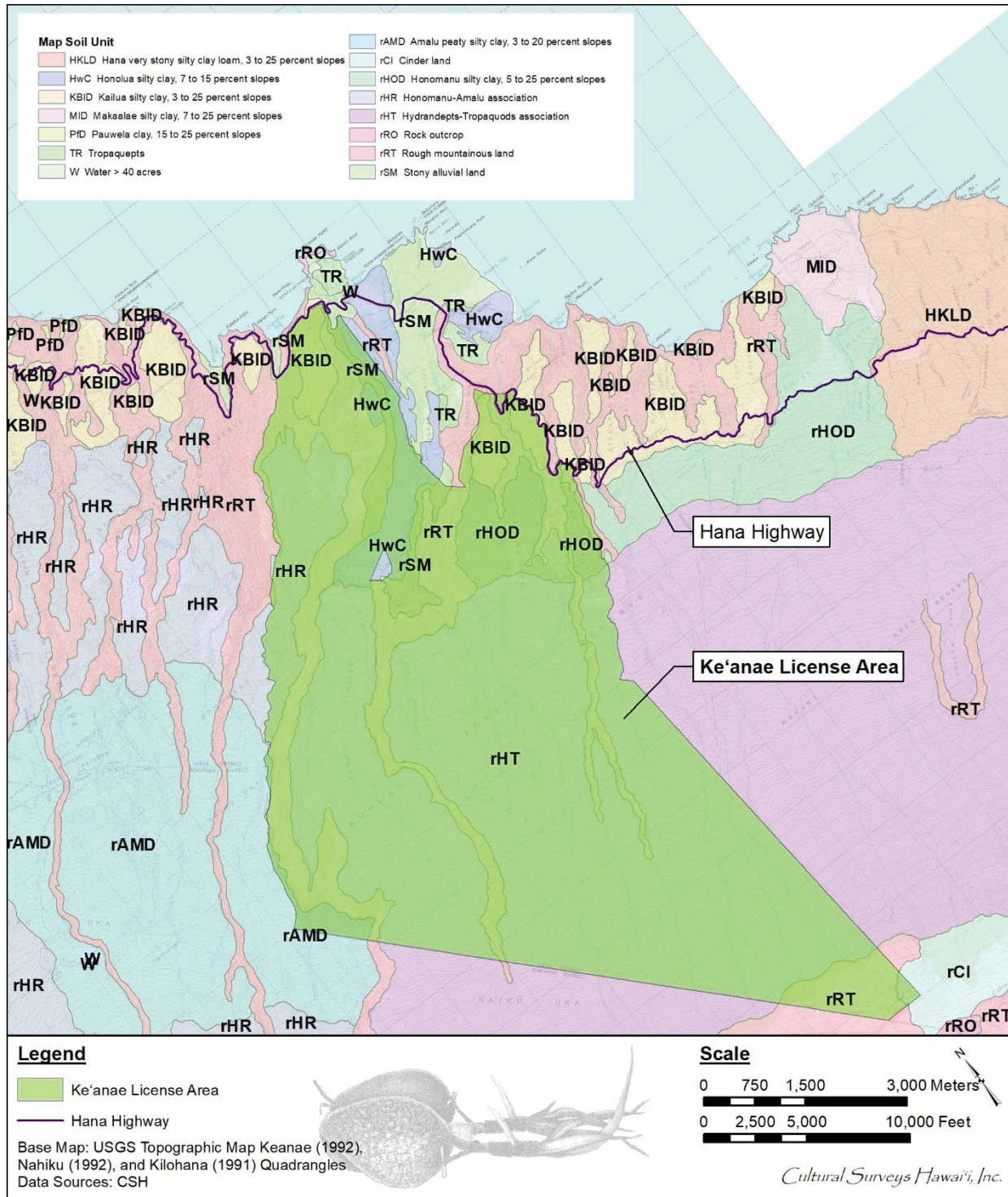


Figure 12. Overlay of *Soil Survey of the State of Hawaii* (Foote et al. 1972), indicating soil types within and surrounding the Keanae License Area (U.S. Department of Agriculture 2001)

Permeability is moderately rapid. Runoff is slow to medium, and the erosion hazard is slight to moderate. The available water capacity is about 1.2 inches per foot in the surface layer and about 1.4 inches per foot in the subsoil. In places roots penetrate to a depth of 5 feet or more...

This soil is used for pineapple, pasture, and woodland. (Capability classification IIIe, nonirrigated; pineapple group 3; pasture group 8; woodland group 7). (Foote et al. 1972:42)

Honomanu silty clay (5 to 25 percent slopes) (rHOD) soils are described as follows:

This soil is on the wettest parts of the northeastern slopes of Haleakala. Included in mapping were small areas of Amalu and Kailua soils and rock outcrops.

In a representative profile the surface layer is very dark brown silt loam and dark yellowish-brown silty clay about 11 inches thick, capped with an organic layer about 3 inches thick. The subsoil, about 26 inches thick, is dark yellowish-brown and brown silty clay that has subangular blocky structure. The substratum is dark yellowish-brown loam and fragmental basic igneous rock. The soil is extremely acid in the surface layer and subsoil.

Permeability is moderately rapid. Runoff is slow, and the erosion hazard is slight. In places roots penetrate to a depth of 4 feet or more...

This soil is used for water supply and wildlife habitat. (Capability classification IVe, nonirrigated; pasture group 11; woodland group 8). (Foote et al. 1972:43)

Hydrandepts-Tropaquods association (rHT) soils are described as follows:

Areas mapped as Hydrandepts-Tropaquods association (rHT) consist of well-drained to poorly drained soils on uplands. These soils are on the northern slopes of West Maui and the northern and eastern slopes of East Maui. They developed in volcanic ash and in material weathered from cinders and basic igneous rock. They are moderately sloping to steep. Elevations range from 1,000 to 6,000 feet: The annual rainfall amounts to 100 to 350 inches. The mean annual soil temperature is 60° F. This association is geographically associated with soils of the Amalu, Honomanu, and Olelo series.

Hydrandepts make up about 60 percent of the association, and Tropaquods 40 percent. Included in mapping were small areas of Rough mountainous land. Also included were small peat bogs.

Hydrandepts are the steeper areas of the association. These are well drained to moderately well drained soils that are similar to those of the Honomanu series. The surface layer is high in organic-matter content. The subsoil is dark-brown or dark yellowish-brown, smeary silty clay loam or silty clay. The substratum consists of volcanic ash and cinders or weathered basic igneous rock. These soils dehydrate irreversibly into fine pebble size aggregates.

Tropaquods are poorly drained soils that are similar to those of the Amalu and Olokui series. They have a peaty or mucky surface layer that overlies a dark gray

to very dark gray, mottled layer. The mottled layer rests on an ironstone sheet ¼ to 1 inch thick. The ironstone is at a depth of 10 to 20 inches. It normally caps highly weathered basic igneous rock.

The soils in this association have low bearing capacity and low shear strength. They are slippery and difficult to traverse. Because of their ability to absorb water and to transmit it rapidly, these soils are important for maintenance of ground water for domestic use and irrigation.

This association is used for water supply and wildlife habitat. The natural vegetation consists of ohia, puakeawe, sedges, false staghorn fern, tree fern, and other rain forest vegetation. (Hydrandepts soils are in capability classification VIIe, nonirrigated. Tropaquods soils are in capability classification VIIw, nonirrigated). (Foote et al. 1972:46)

### 1.3.1.7 Soils within Nāhiku License Area

According to the U.S. Department of Agriculture (2001) Soil Survey Geographic (SSURGO) database and soil survey data gathered by Foote et al. (1972), the soils within the Nāhiku license area consist of Kailua silty clay (3 to 25 percent slopes) (KBID), Honomanu silty clay (5 to 25 percent slopes) (rHOD), Hana very stony silty clay loam (3 to 25 percent slopes) (HKLD), Rough mountainous land (rRT), Hydrandepts-Tropaquods association (rHT), and Cinder land (rCl) (Figure 13).

Hana very stony silty clay loam (3 to 25 percent slopes) (HKLD) soils are described as follows:

This soil is on smooth, low mountain slopes. Included in mapping were small areas of Honomanu soils. Also included were small, steep areas near cinder cones.

In a representative profile, the surface layer is very dark-brown and very dark grayish-brown silty clay loam about 12 inches thick. The subsoil, about 22 inches thick, is dark-brown silty clay loam that has subangular blocky structure. The substratum is moderately weathered, pebble-size cinders overlying a'ā lava. The soil is strongly acid to medium acid in the surface layer and slightly acid in the subsoil.

Permeability is moderately rapid. Runoff is slow to medium, and the erosion hazard is slight to moderate. In places roots penetrate to a depth of 3 to 4 feet. The available water capacity is about 1.2 inches per foot in the surface layer and 1.4 inches per foot in the subsoil...

This soil is used for pasture. (Capability classification VIs, nonirrigated; pasture group 11; woodland group 8). (Foote et al. 1972:37)

Cinder land (rCl) is described as follows:

Cinder land (rCl) consists of areas of bedded magmatic ejecta associated with cinder cones. It is a mixture of cinders, pumice, and ash. These materials are black, red, yellow, brown, or variegated in color. They have jagged edges and a glassy appearance and show little or no evidence of soil development.



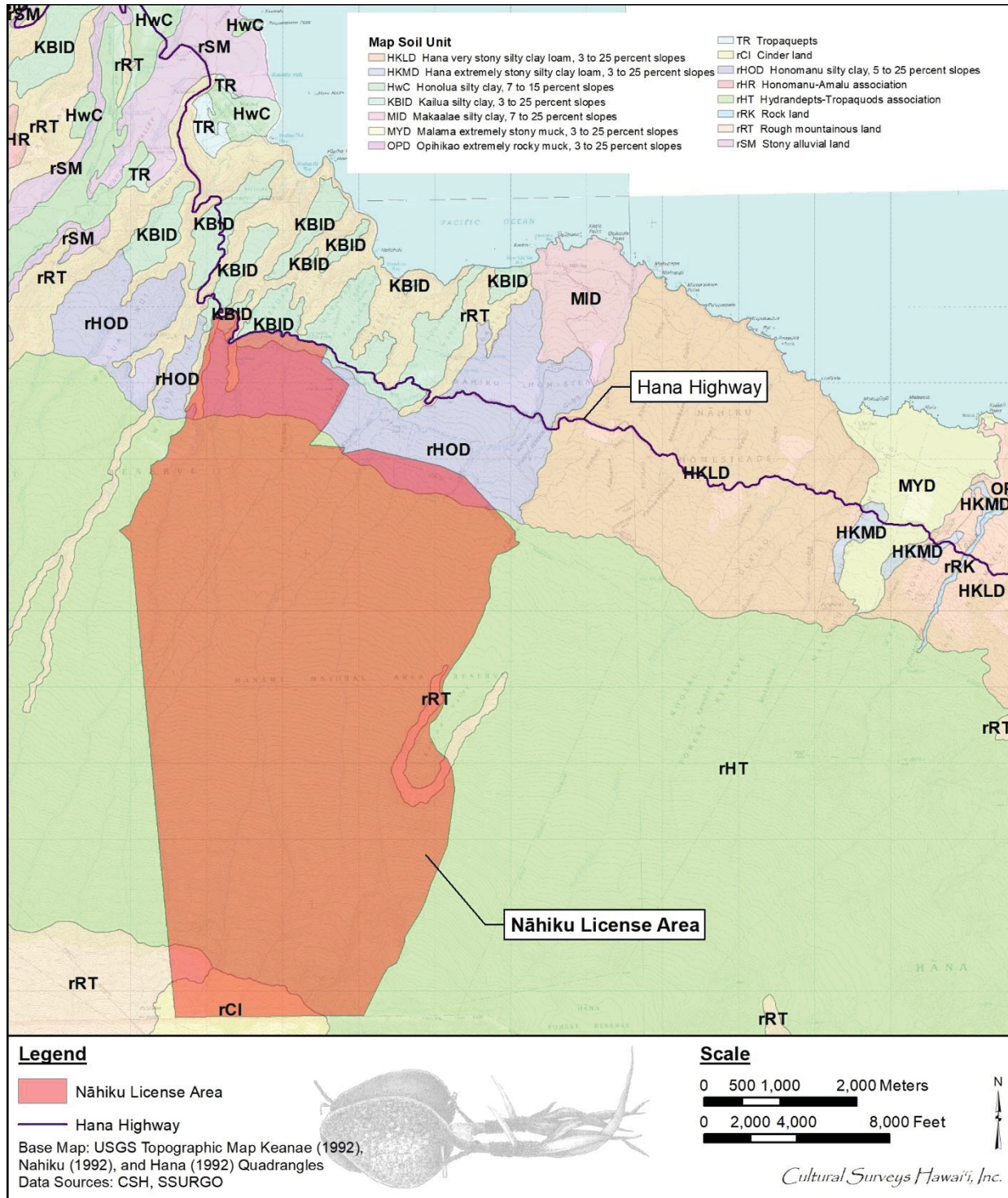


Figure 13. Overlay of *Soil Survey of the State of Hawaii* (Foote et al. 1972), indicating soil types within and surrounding the Nāhiku License Area (U.S. Department of Agriculture 2001)

Cinder land occurs on the islands of Maui and Oahu. On Maui, it is mainly at elevations between 8,000 and 10,000 feet in the Haleakala National Park. On Oahu, it is mainly at elevations between 200 and 2,000 feet, near Mount Tantalus. The annual rainfall amounts to 20 to 30 inches on Maui and 60 to 100 inches on Oahu.

Although Cinder land commonly supports some vegetation, it has no value for grazing, because of its loose nature and poor trafficability; It is used for wildlife habitat and recreational areas. (Capability classification VIIIs, nonirrigated). (Foote et al. 1972)

### **1.3.2 Built Environment**

The built environment of the License Area includes the EMI Aqueduct System comprised of approximately 50 miles of tunnels, 24 miles of ditches, 13 inverted siphons, and approximately 388 intakes. In addition, the system is served by approximately 62 miles of private roads and a solar-powered radio telemetry system to monitor ditch flows (ASCE 2001). The License Area is located upslope from Hāna Highway, the only major thoroughfare that extends through East Maui. The highway itself includes 56 bridges or culverts in the vicinity of the License Area. Several coastal communities are located on the seaward side of Hāna Highway and outside of the License Area.



## Section 2 Background Research

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### 2.1 Research Methods

Background research included a review of previous archaeological studies on file at the SHPD; review of documents at Hamilton Library of the University of Hawai'i, the Hawai'i State Archives, the Mission Houses Museum Library, the Hawai'i Public Library, and the Archives of the Bishop Museum; study of historic photographs at the Hawai'i State Archives and the Archives of the Bishop Museum; study of historic maps at the Survey Office of the Department of Land and Natural Resources; and study of online historic newspaper databases. Historic maps and photographs from the CSH library were also consulted. In addition, Māhele records were examined from the Waihona 'Aina (2000) database.

Background research for this investigation is presented as a chronology and is further subdivided to present information related to specific events, topics, or locations. Prior to the current study, extensive research has been conducted throughout East Maui with varied foci (Duensing 2005; Group 70 International et al. 1995; E. S. C. Handy et al. 1991; Soehren 1963; Thrum 1909b; Walker 1931). This archaeological investigation will often cite many of these previous studies as well as supportive primary source material whenever possible.

In addition to the archaeology-focused research conducted as part of this investigation, the Environmental Impact Statement for the current project will include architectural history of the EMI Aqueduct System within the context of a historic architecture report, cultural history of the License Area within the context of a cultural impact assessment, and numerous other multidisciplinary perspectives including, among other things, studies of social impacts, hydrology, and marine/terrestrial biota.

### 2.2 Traditional Background of Hāmākua Loa Moku

The division of Maui's lands into political districts first occurred during the rule of Kaka'alaneo under the direction of his *kahuna* (priest) Kalaiha'ōhi'a (Beckwith 1970:383). The *moku o loko*, or *moku* as it is most commonly called, literally means "to cut across, divide, separate" (Lucas 1995:77). When used as a term of traditional land tenure, a *moku* is similar to a political district that can contain smaller divisions of land such as *'okana*, *kalana*, *ahupua'a*, *'ili*, and *mo'o*.

According to Mary Pukui et al. (1974:49), the literal translation of Hāmākua Loa is "long Hāmākua, where Hāmākua means corner." There are several place names in the various *ahupua'a* which make up this *moku* that are recorded by Pukui et al. (1974). Much of the historical and traditional information is related to adjacent *ahupua'a* and is recounted here briefly because of the close relationship to the adjacent *moku* of Ko'olau.

Given the state of warfare between Maui and Hawai'i Islands in the late pre-Contact period, there are storied accounts of the actions of passing armies in their disputes over ownership of the resources of East Maui. One such legend comes from the late 1700s when Kalani'ōpu'u, high chief from Hawai'i Island, was involved in a campaign against Kahekili of Maui. In an excerpt from *Account of the Polynesian Race* taken from Sterling (1998:102), Fornander describes the account of Kalani'ōpu'u landing on Maui to reprovision after a successful military campaign on Lāna'i:

Then, rounding Kahakuloa, he stood to the eastward, and landed at Hamakualoa, on Maui, where he plundered the country and committed fearful barbarities on the people, until Kahekili came to their support with his forces, and after several encounters, drove Kalaniopuu on board of his fleet. Foiled in Hamakualoa, Kalaniopuu made his next descent in the Koolau district, committing similar depredations and barbarities there. While there, he was joined by Mahihelelima, the Hawaii [Island] governor of the adjoining Hana district, with a select force of warriors, and being thus enabled to rally and hold his ground against Kahekili, he again attempted the invasion of Hamakualoa, where the war was protracted, with varying success, for several months. (Fornander in Sterling 1998:102)

It was during this extended period of warfare between Kahekili and Kalani'ōpu'u that the advent of Western contact came upon the Hawaiian Islands, with Kalani'ōpu'u at the fore of its arrival off the coast of Maui. In 1778, when Capt. James Cook's ships returned from their North American explorations, they stopped off shore of East Maui but could not land. In *Exalted Sits the Chief*, Ross Cordy (2000:294) places Kalani'ōpu'u at this first point of contact between Hawai'i and the West:

Kalani'ōpu'u had regrouped and again invaded Maui ca. 1778-pillaging Kaupō and Kaho'olawe ... and raiding and engaging Kahekili's forces in Ko'olau and Hāmākualoa. It was during this campaign when Captain Cook arrived off Maui's Hāmākualoa in November 1778. Kalani'ōpu'u went on board briefly, wearing a helmet with yellow and black feathers and a long feathered cloak. (Cordy 2000:294)

Kalani'ōpu'u and Kamehameha I (then, in the war company of Kalani'ōpu'u) both visited Cook's ships, indicating who controlled the East Maui region. The Kahekili and Kalani'ōpu'u saga was not the last war to leave its marks upon the lands of Hāmākua Loa. Less than two decades later the first king of a unified Hawai'i, Kamehameha I, would also pass through this region on his campaign to create a unified Hawaiian Kingdom.

Excerpts of Fornander's *Account of the Polynesian Race* in Sterling (1998:103) also mention places that were visited by Kamehameha I during his campaign to take the fertile stream-fed valleys of Wailuku:

Of the campaign in Hamakualoa some mementos are still pointed out. The fortified position at Puukoae [*Puukaae on later maps*] on Hanawana, which was attacked and taken by Kamehameha, who had brought his fleet round from Hana. The hill is known as "Kapuai-o-Kamehameha," to the west of the Halehaku stream, where he encamped for the night after taking Puukoae. Here his war god Kukailimoku was paraded around the camp, to ascertain by the usual auguries-the more or less erect position of the feathers, &-the issue of the campaign. ... the Maui forces were routed and fled as far as Kokomo, where a final stand was made. Fighting desperately, and with hardly a hope of retrieving the fortune of the day, Kapakahili encountered Kamehameha on the field ... Kapakahili was killed, the Maui men fled and dispersed, and the road to Wailuku lay open to Kamehameha. (Fornander in Sterling 1998:103)

Another account mentions Kamehameha I presence on a hill located on the shore just west of Halehaku Bay. An excerpt of an article by John H. Wise in the 6 December 1911 issue of *Ke Au Hou*, translated by and included in Sterling (1998:104) bears this account:

The battle forces of Kamehameha moved on from there in Koolau to Hamakuapoko and that was the place where Kamehameha battle companies were forced back a little by Maui's sons, however, because of the excessive bravery and strength of Kamehameha, the Maui people's losses were severe at the stream of Kapiki [*Kakipi?*] in Halehaku and the imprint of Kamehameha's foot remains on the face of one of the hills to this day (J.H. Wise in Sterling 1998:104)

Though the author attributes this place to Hāmākuapoko, the traditional *moku* east of Hāmākua Loa, the actual stream of Halehaku lies in the center of Hāmākua Loa. In this way, many landmarks and natural features of the Hāmākua Loa region have been witness to the various social and political currents of the Island by bearing names and stories associated with local history and lore.

### 2.2.1 Place Names of Hāmākua Loa

E. S. C. Handy et al. (1991:23-24,42) summarizes the relationship that traditional Hawaiians have had with the natural environment in the following passage:

The sky, sea, and earth, and all in and on them are alive with meaning indelibly impressed upon every fiber of the unconscious as well as the conscious psyche. Hawaiian poetry and folklore reveal this intimate rapport with the elements, (E. S. C. Handy et al. 1991:23-24)

... the relationship which existed from very early times between the Hawaiian people ... is abundantly exemplified in traditional *mele* (songs), in *pule* (prayer chants), and in genealogical records which associate the ancestors, primordial and more recent, with their individual homelands, celebrating always the outstanding qualities and features of those lands. (E. S. C. Handy et al. 1991:42)

These subtle observations of the interconnectedness of people, places, and deeds figure largely in the naming of places of note, also called *wahi pana*. The regional place names below, along with the environmental data, indicate that the lands within Hāmākua Loa Moku were widely used for many purposes relevant to traditional Hawaiian subsistence, habitation, and history. The perennial and seasonal watersheds on this side of the island bear many names associated with agricultural, domestic, and recreational uses of the local streams and pools. Sometimes these place names are references to the actions of historic individuals, and at other times to the deeds of legendary or mythological figures, but often are rich with the symbolic associations to the point of encompassing a comprehensive history of a place that can combine all these elements. Literal translations of many of the place names for land areas and divisions in Hāmākua Loa Moku are listed in Table 1 and may provide insight into this area prior to Western contact. Unless otherwise noted, translations are cited from Pukui et al. (1974) *Place Names of Hawaii*.



Table 1. Place Names within Hāmākua Loa Moku [from Pukui et al. (1974) unless otherwise noted]

Name	Translation/Association
Āwiki	<i>'Ili</i> place name in Halehaku; <i>lit.</i> , “swift” (Ulukau 2006)
Ha‘i-kū	<i>Ahupua‘a</i> , town, and reservoir; <i>lit.</i> , “speak abruptly” or “sharp break” (p. 34); known location of hills of fine dune sand, some of which bore the bleached bones of past battles (H.T. Cheever in Sterling 1998:97)
Hakakaupueo	Congregational church at Huelo in Ha‘ikū; <i>lit.</i> , “owl-resting perch”; owls perched in a pandanus grove here (p. 35)
Halapē	<i>Heiau</i> on the boundary between Waipio, Komohana, and Mokupapa; <i>lit.</i> , “crushed” or “missing” (Ulukau 2006)
Hala‘ula	<i>'Ili ‘āina</i> place name in Honopou; <i>lit.</i> , “red pandanus” (Ulukau 2006)
Hālauolōlo	<i>'Ili ‘āina</i> place name in Halehaku; <i>lit.</i> , “long, narrow house” (Ulukau 2006)
Halehaku	<i>Ahupua‘a</i> , bay, point, stream, and gulch; <i>lit.</i> , “master house” (Ulukau 2006)
Haleola	<i>'Ili ‘āina</i> in Mo‘oloa Ahupua‘a; <i>lit.</i> , “house of life” (Ulukau 2006)
Hāmākua Loa	One of 12 ancient districts ( <i>moku</i> ) of Maui Island; <i>lit.</i> , “long hāmākua” where <i>hāmākua</i> means corner (p. 39)
Hanawana	<i>Ahupua‘a</i> , point, and stream; <i>lit.</i> , “sea urchin bay” (p. 41)
Honokalā	<i>Ahupua‘a</i> , point, gulch, and stream; <i>lit.</i> , “the sun bay” (p. 49)
Honopou	<i>Ahupua‘a</i> , point, and stream; <i>lit.</i> , “post harbor” (p. 50)
Ho‘olawa	<i>Ahupua‘a</i> , bay, point, and stream; <i>lit.</i> , “to supply sufficiently” (Ulukau 2006)
Ho‘olawanui	Stream in Ha‘ikū; <i>lit.</i> , “make great sufficiently” (p. 51)
Huelo	<i>Ahupua‘a</i> , village, stream, and point; a game, originated by Papio, was played here; <i>loulou</i> palm leaves were woven into hammocks upon which players were laid and then tossed into the sea (p. 53)
Ka‘aiea	Stream and gulch in Punaluu Ahupua‘a; <i>lit.</i> , “the ‘aiea tree” (Ulukau 2006)
Ka‘alukanu	<i>'Ili ‘āina</i> in Honopou; <i>lit.</i> , “the planting depression” (Ulukau 2006)

<b>Kaholo</b>	<i>'Ili 'āina</i> place name near Peahi; <i>lit.</i> , “the running” (Ulukau 2006)
<b>Kahouiki</b>	<i>'Ili 'āina</i> in Honopou; <i>lit.</i> , “the small <i>hau</i> tree” (Ulukau 2006)
<b>Kailili</b>	Place name in Hāmākua Loa; <i>lit.</i> , “the pebble” (Ulukau 2006)
<b>Kākipi</b>	Stream and gulch; a type of <i>poi</i> made from soggy taro (Ulukau 2006)
<b>Kaohekanu</b>	Stretch of land between Kawahinepee and Papaaea; known as a “place of robbers” for the treacherous passage through the region prior to being paved by Kihaapiilani (Moses Manu in Sterling 1998:101)
<b>Kapahi</b>	<i>'Ili 'āina</i> in Honopou Ahupua'a; <i>lit.</i> , “the knife” (Ulukau 2006)
<b>Kapeku</b>	<i>'Ili 'āina</i> in Honopou Ahupua'a; <i>lit.</i> , “the kick” (Ulukau 2006)
<b>Kapua</b>	<i>'Ili 'āina</i> in Hāmākua Loa; <i>lit.</i> , “the flower” (Ulukau 2006)
<b>Kauhihale</b>	<i>Heiau</i> in Pu'u o Maile Ahupua'a; <i>lit.</i> , “house of Kauhi” (Ulukau 2006)
<b>Kaulanapueo</b>	Church and place name in Hāmākua Loa; <i>lit.</i> , “owl perch” (p. 93)
<b>Kawahaokapua'a</b>	<i>'Ili 'āina</i> in Huelo; <i>lit.</i> , “mouth of the pig” (Ulukau 2006)
<b>Keali'i</b>	Gulch and stream; <i>lit.</i> , “the chief” (p. 102)
<b>Keali'i Iki</b>	<i>Ahupua'a</i> ; <i>lit.</i> , “small <i>keali'i</i> ” (p. 102)
<b>Keali'i Nui</b>	<i>Ahupua'a</i> ; <i>lit.</i> , “large <i>keali'i</i> ” (p. 102)
<b>Kokomo</b>	Historic saw mill; said to have been originally <i>Koa-komo</i> , <i>lit.</i> , “ <i>koa</i> tree entering” (p. 116), because a huge tree spread out its branches beside the trail and travelers went through under the <i>koa</i> branches (Ulukau 2006)
<b>Lālāola</b>	<i>Heiau</i> once located on an <i>'ili</i> of the same name; <i>lit.</i> , “living branch” (Ulukau 2006)
<b>Liliko'i</b>	Gulch and stream; a passion fruit said to have been named after where it was first grown, Liliko'i, on Maui Island (Ulukau 2006)
<b>Makaīwa</b>	<i>Ahupua'a</i> and bay; <i>lit.</i> , “mother-of-pearl eyes” (p. 140)
<b>Makawao</b>	<i>Moku</i> and <i>ahupua'a</i> ; <i>lit.</i> , “forest beginning” (p. 142)
<b>Māliko</b>	Bay, stream and gulch; <i>lit.</i> , “Budding” (p. 144)

<b>Mokupapa</b>	<i>Ahupua'a</i> , gulch, and stream; <i>lit.</i> , “flat island” (p. 156); also name of Walker Heiau Site 70 in Ha'ikū, Moku-papa-akua (Ulukau 2006)
<b>Mo'oloa</b>	<i>Ahupua'a</i> ; <i>lit</i> “long <i>mo'o</i> ” where <i>mo'o</i> can mean either lizard or land parcel/ridge (Ulukau 2006)
<b>Nalowale</b>	Unknown <i>heiau</i> ; <i>lit.</i> , “lost, forgotten” (Ulukau 2006)
<b>'O'opuola</b>	Cove, point, and stream; a stroke in <i>lua</i> fighting, another name for Makaīwa Bay (Ulukau 2006)
<b>Pa'akea</b>	<i>Ahupua'a</i> , stream, and gulch; <i>lit.</i> , “coral bed, limestone” (Ulukau 2006)
<b>Pālama</b>	Stream and gulch; <i>lit.</i> , “ <i>lama</i> wood enclosure” (Ulukau 2006)
<b>Pāpa'a'ea</b>	<i>Ahupua'a</i> and reservoir; <i>lit.</i> , “turtle shell piece”; Kiha-a-Pi'ilani made a long paved road beginning here (p. 179)
<b>Pa'uwela</b>	<i>Ahupua'a</i> , point, gulch, stream, and reservoir; <i>lit.</i> , “hot soot” (p. 182)
<b>Pi'ilani</b>	<i>Heiau</i> in Halehaku; named after famous Maui chief (p. 184)
<b>Pōhaku</b>	<i>'Ili 'aina</i> in Honopou <i>Ahupua'a</i> ; <i>lit.</i> , “rock, stone” (p. 186)
<b>Pōhaku'ele</b>	<i>'Ili 'āina</i> in Halehaku; <i>lit.</i> , “black rock” (Ulukau 2006)
<b>Pōhakuokai'a</b>	<i>Heiau</i> ; <i>lit.</i> , “stone of the fish” (Sterling 1998:106)
<b>Pualoalo</b>	<i>'Ili 'āina</i> in Hāmākua Loa; short for <i>pua aloalo</i> , <i>lit.</i> , “hibiscus flower” (Ulukau 2006)
<b>Wai'alaea</b>	<i>'Ili 'āina</i> in Huelo; <i>lit.</i> , “red earth water” (Ulukau 2006)
<b>Wailua</b>	<i>Ahupua'a</i> , stream, village, homestead, and cove; <i>lit.</i> , “two waters” (Ulukau 2006)
<b>Waihiwa</b>	<i>'Ili 'āina</i> in Honopou; <i>lit.</i> , “Hiwa's water” (Ulukau 2006)
<b>Waipi'o</b>	<i>Ahupua'a</i> , gulch, and bay; <i>lit.</i> , “curved water” (p. 227)

### 2.2.2 Legends of Hāmākua Loa Moku

With its location between the wetter *moku* of Ko‘olau and Nā Wai Eha with their perennial watersheds, the Hāmākua Loa region has been associated with several figures from Hawaiian lore. Being surrounded by regions with flowing water as well as containing some of its own in seasonal intervals, there are local associations with the Hawaiian god of flowing water, Kāne, and fresh water springs in Hāmākua Loa. In a Hawaiian language newspaper titled *Ka Nupepa Kuokoa* in Sterling (1998:101), the author John Waiamau details a legendary shore visit to Hāmākua Loa from the gods Kāne and Kanaloa on their tour of Hawai‘i after arriving from Kahiki (Tahiti):

Kaneloa [*sic*] said to Kane, “We have circled Hawaii let us go to Maui.” They sailed to and landed on Maui. They toured Maui until they reached Hamakua. They drank awa but because there was no water they caused the fresh water to flow and drank all of the awa. They continued on and the water which they caused to flow was called the water of Kaneloa. This water flows unto this day. (Waiamau in Sterling 1998:101)

It is uncertain whether the water of Kanaloa in this anecdote refers to a specific place in Hāmākua Loa or whether it refers to all the springs in the Hāmākua districts. It is not surprising that Kāne and Kanaloa would have left their mark in Hāmākua Loa as they did in similar fashion at other watersheds in East Maui. Kāne and Kanaloa are not the only legendary figures to have been associated with Hāmākua Loa. The legends surrounding the abduction of Hina, the floating hill of Hā‘upu, and the abduction and sequestering of the former on the latter on the island of Moloka‘i also make mention of the *moku* of Hāmākua Loa.

The myth of Kana, firstborn of Hākalani and his wife, Hina, begins on Maui in the region of Hāmākua Loa, where Kana’s grandmother, Uli lived. Kana was born with extraordinary and mysterious powers. At the birth of Kana, he was in the form of a piece of rope; and had no human form. His grandmother, Uli, took the rope and kept it until it assumed a human form, then she brought the child up. In this legend, Kana grew to be very tall and large. Another son was born to Hina, Niheu, who also grew to be very large and powerful. Hina was abducted by Kapepe‘ekauila, the chief of the hill of Hā‘upu, and she was borne away to Moloka‘i on a magical hill, in the form of a giant turtle; that floated her to Hā‘upu, in Pelekunu Valley on Moloka‘i. Hākalani went to Kana to ask for his help to retrieve their mother. Those throughout Hawai‘i who could build canoes were called to service. The only canoe worthy to carry Kana to Moloka‘i was found at Paliuli, at Ka‘u; where Kana’s grandmother told him to procure a large double canoe there. The canoe was produced through the magical powers of Uli. The magical canoe, named Kaumai‘eli‘eli, was brought to Hāna from Puna. Warriors were seated in the canoe, with the prominent places taken by Kana and Niheu. Sailing to Moloka‘i, the magical canoe of Kana and Niheu met with a seaborne attack by Kapepe‘ekauila’s warriors. The attackers were swiftly destroyed by Niheu and his war club. Kana, with his great strength, stopped great boulders from rolling down the cliffs of Waikolu Bay, thus averting disaster. Niheu jumped from the canoe to the hill of Hā‘upu to rescue his mother. The floating hill of Hā‘upu was magical, and tried many devices to keep Niheu at bay. Although he had found Hina, he had lost her while beating back an attack by Kapepe‘ekauila. Kana told Niheu to protect the canoe. Kana then assumed the form of a giant spider’s web. He stretched and bent himself over Moloka‘i, and over the mountain of Haleakalā, in order to visit his grandmother Uli in Kona on the island of Hawai‘i. She fed him food, so that he would be strong enough to fight



for the return of Hina. Kana was successful in his attack, and Hina was returned to Kana's father, Hākanileo (Fornander 1916:436-444).

Other references suggests there may be a connection between Hāmākua Loa, Hina, and 'Ai'ai, both legendary figures associated with East Maui. Hina is one of the most widely known goddesses of Polynesia and is said to have resided on East Maui (E. S. C. Handy et al. 1991:206). She is most popularly associated with the demi god Maui, who was one of her sons who lived on Haleakalā in East Maui and performed legendary feats such as snaring the sun, fishing up the islands, and lifting the sky, among other feats. However, Hinapukui'a is recognized as a goddess who gives abundance of fish and in the story of Ku'ula, she appears as the mother of 'Ai'ai (Beckwith 1970:20).

In one version of the story of Ku'ula, also known as Ku'ulakai, is said to originate from the Hāna area, Maui. There he lived with his wife Hinapukui'a, his brother Ku'ulauka (god of cultivators) and Ku'ulauka's wife Hinaulu'ohi'a (sister of Hinapukui'a and goddess of forest growth). Ku'ula lived during the reign of Kamohoali'i under which he served as head fisherman. At the time of his death, Ku'ula prepares for the future by instructing his son 'Ai'ai on the powers of attracting fish, on establishing fishing stations in the islands and gives 'Ai'ai his magic objects including "a decoy stick called Pahiakukahuoi (kahuai), a cowry called Leho-ula, a hook called Manai-a-ka-Iani, and a stone called Ku'ula which, if dropped into a pool, had the power to draw the fish thither" (Beckwith 1970:19).

'Ai'ai follows in the footsteps of his father, using his knowledge and power and his magic objects to set up new fishing grounds around the islands. In his travels, several fishing grounds are noted on East Maui:

The first fishing ground marked out by Aiai is that of the Hole-of-the-ulua where the great eel hid. A second lies between Hamoa and Hanao in Hana, where fish are caught by letting down baskets into the sea. A third is Koa-uli in the deep sea. A fourth is the famous akule fishing ground at Wana-ula mentioned above. At Honomaele he places three pebbles and they form a ridge where aweoweo fish gather. At Waiohue he sets up on a rocky islet the stone Paka to attract fish. From the cliff of Puhai-ai he directs the luring of the great octopus from its hole off Wailua nui by means of the magic cowry shell and the monster is still to be seen turned to stone with one arm missing, broken off in the struggle. Leaving Hana, he establishes fishing stations and altars along the coast all around the island as far as Kipahulu ... (Wahiako in Beckwith 1970:21-23)

No fishing ground in Hamakualoa is mentioned in this legend, however it is likely fishing grounds existed there. A record of two fishing temples in or near Hanawana suggests that, as in other areas of East Maui, this area also held a strong fishing tradition (Ashdown 1971:53).

### 2.2.3 Open Ocean Fishing Traditions of East Maui

As a life near the shore would suggest, Native Hawaiians depended heavily on their access to ocean resources just as they depended upon the products of the land. In *Tales and Traditions of the People of Old: Nā Mo'olelo a ka Po'e Kahiko*, Hawaiian historian Samuel Kamakau (1991:78) states:

Ka po'e kahiko [the people of the old days] had many ways of catching fish. Perhaps there are no other people in the world like Hawaiians in doing this. The

people of Maui, at Ko'olau, worshipped sharks – in order to be saved from being eaten by a shark when they went fishing. (Kamakau 1991:78)

Documentation regarding Native Hawaiian tenancy, land use practices, and fishing rights are also found in the records of the Māhele 'Āina. The Māhele 'Āina gave *hoa'aina* [common people engaged in agriculture] an opportunity to acquire fee-simple property interest on land which they lived and actively cultivated. The lands awarded to the *hoa'aina* became known under the title of *kuleana* lands. Claims for some fishery resources made to the Land Commission of the Kingdom of Hawai'i were given Land Commission Award (LCA) numbers, some of which remain in use today. First-hand accounts from native tenants generally spanning the period from ca. 1819 to 1855 have become an important part of recognizing the traditional significance of these land use practices and fishing rights (Waihona 'Aina 2000).

In a series of articles about fishing from 1902 recounted in *Ka 'Oihana Lawai'a: Hawaiian Fishing Tradition* by Daniel Kahā'ulelio (2006), an open ocean type of fishing was the preferred method of fishing used in deep waters along the coast of East Maui. In waters of ten or more fathoms deep the use of *kākā* line fishing and the *kūkaula* line fishing techniques were developed and employed, which are defined by Kahā'ulelio (2006:45) as:

In this [*kākā*] kind of fishing, no stone weight was needed to anchor the canoe and it drifted to and fro moving with the current. The line was five *ka'au* in length, which was the equivalent of 200 fathoms, and that was about the depth of the fishing grounds desired to reach. Two or three men was enough for this type of fishing and each man had from forty to fifty hooks on his line.

This is the way in which it was done. The leader that fastened the hook to the line was a yard or so in length, and it would be tied along with a coconut stem to keep it firmly in place. The hooks were fastened at intervals the length of each coconut stem, lest the hooks be mixed up and entangled. This was done until all forty or fifty hooks were fastened on. Bait was secured in the evening and the hooks of all the fishermen baited before time. When all was ready, then, just about daylight they set out, arriving at the fishing grounds when it was light. The man in the rear would release his line first, then the next man and so on. With a stone weight at the bottom of the line, to make it sink correctly, As the second man began lowering his line, the first already felt a jerking on his and as soon as he knew that all of his hooks had been taken he hauled in the line. They all did this. Then the sails were set up and the Ma'a'a breeze did the work of bringing them home. (Kahā'ulelio 2006:45)

Kahā'ulelio continues and defines *kūkaula* fishing:

This is still in use, and only where the fishing ground is shallow, from fifty, sixty to seventy fathoms deep and not any deeper than that. If at the depth of eighty fathoms, then only small fish will be caught such as the *'ukikiki* [A species of snapper fish (*Apsilus brighami*)] and small *'ula'ula* [red snapper (*Etelis coruscans*)]. At sixty or fifty fathoms in depth, the fish would snatch at the hook if the current is right.

The line is 80 or 120 fathoms in length and to it we tie coconut husks for signals when the hook is taken. It is made in this way; the first husk is tied on at forty

fathoms and that is called the *nuku*, or snout; at five more fathoms, another is fastened on, this is the *alo*, or face; at the next five fathoms, another is fastened on, called the *kua*, or back; at the next five fathoms, is the *manamana*, the branching; at the next five, the *i'aiki*, or little fish; the next is the *kuaokai'aiki*, the back of the little fish; the next is *moe*, the recumbent, and that is the last of the coconut husk signals. (Kahā'ulelio 2006:45)

Using these techniques Native Hawaiians were able to catch deep water fish from the waters off the north and east shores of Maui. This practice was not isolated to Hāmākua Loa Moku only, and represents techniques used across many deep sea fisheries including those located off the coast of neighboring Ko'olau Moku to the East.

## 2.3 Traditional Background of Ko'olau Moku

The *kālana*, or subregion, that forms the *moku* of Ko'olau has been defined as a collection of *ahupua'a*, including Honolulu Nui, Honolulu Iki, Honopou, Wailua, Honomanū, Kali'i, Kukui [Nāhiku], Ke'anae, Keopuka, [Ka] Pa'akea, Puakea, Kapehu, Kapā'ula, Kea'ā, Pauwalu [Ke'anae], Waiahole, Waiohue, Waianu, 'Ula'ino, and Makapipi [Nāhiku] that supported important population centers on the island of Maui. Handy stated that Ke'anae and Wailua Nui were regions that supported intensive and extensive wet-taro cultivation (E. S. C. Handy et al. 1991:272). It was further noted that, in this region of Maui, the *ahupua'a* are marked from stream to stream, rather than from ridge to ridge (McGregor 2007:83).

Ko'olau Moku, on the northeast coast of Maui is located in between Hāmākua Loa Moku to the west and Hāna Moku to the east. A literal translation of *Ko'olau* is "windward" (Pukui et al. 1974:117). Additionally the name Ko'olau traditionally has been applied to the districts located on the windward side of many Hawaiian Islands (Soehren 2002-2010). Although Ko'olau Moku extends from O'opuola Point to beyond Nāhiku, the lands from Wailua to Ke'anae are considered to be some of the denser areas of habitation throughout the region (E. S. C. Handy et al. 1991:499-501).

With regard to political influence and the course of pre-Contact Hawaiian history, it has been noted that there may have been some rivalry within Ko'olau Moku between the *ahupua'a* of Ke'anae and neighboring Wailuanui (C. E. S. Handy 1940:109-110). These interregional rivalries, however, would give way to larger political battles concerning the rule of Maui Island and the line of succession between the sons of Pi'ilani (Kamakau 1992:22-29), and later, the consolidation of power and unification of the Hawaiian Islands under Kamehameha I (Group 70 International et al. 1995)

Chief Pi'ilani united all of Maui under his rule between the sixteenth and seventeenth centuries. Pi'ilani's sons, Lonopi'ilani and Kiha-a-Pi'ilani, were contenders for control of Maui. Kiha-a-Pi'ilani eventually took refuge at Hāna while fleeing the warriors loyal to his brother. While in Hāna, Kiha-a-Pi'ilani took as his wife Koleamoku, who had been betrothed to Lonopi'ilani, which again put the two brothers to warring. Kiha-a-Pi'ilani was on the run from his brother across Maui until a ritual ceremony performed by the *kahuna nui* [high priest] revealed that he must flee Maui to preserve his life, but would eventually return to conquer and unify the island (Kirch 2012:208).

At this time, the reigning chief of Hawai'i Island, 'Umi-a-Liloa, was married to Pi'ikea, the daughter of Pi'ilani and sister to Lonopi'ilani and Kiha-a-Pi'ilani. This marriage had formerly

brought peace between the island polities of Hawai'i and Maui. Kiha-a-Pi'ilani and his wife Koleamoku fled Maui and set out to his sister's residence asking for help from 'Umi's household on Hawai'i Island. In response to this 'Umi "[h]aving received favorable auguries from the high priest, Kaoleioku, 'Umi summoned the chiefs of the various districts to prepare for the invasion of Maui" (Fornander 1880:98). 'Umi not only sided with Kiha-a-Pi'ilani and sent an invasion fleet to Hāna, but also sent along one of his most notorious warriors, Pi'imaiwa'a, who had been instrumental in the battles that won 'Umi all of Hawai'i Island. The campaign met with difficulty in taking Hāna before the Hawai'i Island men had even made ground on Maui. Samuel Kamakau (1992:293) relates the account:

When 'Umi-a-Liloa arrived with the later company he heard how his canoemen were unable to go ashore and how they were held at bay by the mighty Maui warrior, Ho'olae-makua. He asked Kiha-a-Pi'i-lani, "Is there no other way of getting the war canoes ashore? We can fight them better on shore, for our present position is an unstable one." Kiha-a-Pi'i-lani answered, "There is a small harbor at Ko'olau called Wailua-iki, and if all the canoes cannot land there, there is another landing at Wailua-nui." The blocked canoes turned about and sailed for Wailua-iki at Ko'olau. (Kamakau 1992:29)

In Hāna, at the fortress hill of Ka'uiki, Lonopi'ilani's forces under the command of Ho'olaemakua, withstood the Hawai'i forces until a nighttime raid overwhelmed them. In *A Shark Going Inland is my Chief*, Kirch (2012:210) tells that Kiha-a-Pi'ilani's men:

... fell upon the slumbering Maui forces. Many were killed, or leaped to their deaths off the steep cliffs encircling the hill. But in the darkness a few escaped, including Ho'olaemakua. Kiha sent Pi'imaiwa'a in search of Ho'olaemakua in the backlands of Hāna ... His hands were brought back to Kiha to confirm his death. (Kirch 2012:210)

With this battle Kiha-a-Pi'ilani gained control of East Maui. Kiha-a-Pi'ilani's brother, Lonopi'ilani, reportedly died of fright before his brother's campaign had a chance to reach Wailuku (Kirch 2012). The death of his brother left Kiha-a-Pi'ilani as the standing ruler of Maui.

In Fornander (1918:180) "Legend of Kihapiilani," after Kiha-a-Pi'ilani and 'Umi's forces conquered the fortress of Ka'uiki at Hāna, Kiha-a-Pi'ilani began to construct a "roadway from Kawaipapa to the forests of Oopuloa [*sic*];" which, "was made and paved with smooth rocks". The roadway Kiha-a-Pi'ilani built was the Ke Alaloe o Maui, which his father (Pi'ilani) had begun some time earlier. The portions of the Alaloe that Kiha-a-Pi'ilani constructed extended one of the first continuous overland routes on the north shore of Maui to help connect the distant communities of the eastern districts to the central isthmus. The section built at this time began in Ko'olau and stretched all the way to Hāmākua Loa (Moses Manu in Sterling 1998:108). For Kiha-a-Pi'ilani, asserting his influence in the region by way of public works was important both socially and economically as the "Makanali, Waikamoi, Puohokamoa and Haipua'ena streams are found in this region of Ko'olau. Here, Native Hawaiian families settled and cultivated gardens in the narrow valleys fed by small streams" (McGregor 2007:91). By connecting the region via a paved trail, the agricultural and human resources became more accessible and could be mobilized in times of need



with greater ease. An additional advantage of the Ke Alaloa o Maui was that word could be sent between villages and ceremonial centers of any invading forces from either Maui or Hawai'i Island encroaching upon the region, which was especially valuable during the middle to late pre-Contact period when the north shore of Maui was changing hands frequently between polities from both Islands (Kirch 2012:206-216).

It was also during this time that Kiha-a-Pi'ilani is believed to have built the massive structure Pi'ilanihale in the Hāna region. This site would later be known as the tallest *heiau* in the entire archipelago. It was built to house the royal line of Pi'ilani in East Maui, and was likely the principal *luakini heiau* [war temple] of Kiha-a-Pi'ilani. Kiha-a-Pi'ilani also began restoring Honua'ula *heiau* just inland of Pu'u Ka'uiki around this time (Griffin 1987). Following this notable battle over the Hāna and Ko'olau districts were the pre-Contact wars between Kahekili and Kalani'ōpu'u recounted earlier in this report (see section 2.2 Traditional Background of Hāmākua Loa).

### 2.3.1 Place Names of Ko'olau, Maui

In the preface of Place Names of Hawaii (Pukui et al. 1974:x), Samuel Elbert states that:

Hawaiians named taro patches, rocks and trees that represented deities and ancestors, sites of houses and heiau, canoe landings, fishing stations in the sea, resting places in the forests, and the tiniest spots where miraculous or interesting events are believed to have taken place.

Place names are far from static ... names are constantly being given to new houses and buildings, land holdings, airstrips, streets, and towns and old names are replaced by new ones ... it is all the more essential, then to record the names and the lore associated with them [the ancient names] now. (Pukui et al. 1974:x)

The regional place names below, along with the environmental data, indicate that the lands within Ko'olau Moku were widely used for many purposes relevant to traditional Hawaiian subsistence, habitation, and history. The perennial watersheds that are abundant on this side of the island bear many names associated with agricultural, domestic, and recreational uses of the local streams and pools. Additionally, locations are named according to the type of resources associated with the area, such as Aihonu (eating of the turtle), which could be reflective either of the region as a harvesting area or as being associated with a specific notable instance of marine hunting and consumption. Along with references to food and resource gathering, many names are also present in the area that are names of fighting strokes in *uluu* fighting or in some other way indicate violent past times and incidences of warfare or strife. In this vein, some of the place names are also associated with conquering polities and bear the names of the chief that took on the construction of sacred *heiau* or other vital infrastructure, such as the Alaloa trail that connects the deep vales of the region to other distant *moku*. This is also not surprising given the long history of political struggles between Maui and Hawai'i Island chiefs for the wetter east-maui region stretching from Hāna to Na Wai Eha in the centuries leading into the period of Western contact. Other names simply exemplify the physical features of the named places in relation to common objects or stories. Some names also will remain elusive within the context of their meaning, obscured by the passage of time and the coveting or overall loss of the oral traditions that credit names to places of significance. Literal translations of many of the place names for land areas and divisions in Ko'olau Moku are listed in Table 2, and may provide some insight to what this area was like prior to Western contact.

Table 2. Place Names within Ko'olau Moku [from Pukui et al. (1974) unless otherwise noted]

Name	Translation/Association
<b>Āhole</b>	Islet; <i>lit.</i> , “fish”; specifically <i>Kuhlia Sandvicensis</i> (p. 6)
<b>Aihonu</b>	Place name in Pauwalu along Waikamilo stream; <i>lit.</i> , “eating of turtle” (Soehren 1963)
<b>Alaloa</b>	Ancient paved trail; <i>lit.</i> , “long road” also known as Pi'ilani Trail; paved trail that ran around both east and west Maui (E. S. C. Handy et al. 1991:490)
<b>Aluea</b>	Islet; <i>lit.</i> , “sagging” (Soehren 1963:194)
<b>Hahāhā</b>	Bay east of Pauwalu Point; <i>lit.</i> , “pant, breathe hard”; noted as a place for shell fish gathering (Soehren 1963:192)
<b>Hāmau</b>	Stream flowing behind Lakini and into Waiokamilo Stream, within Wailuanui; <i>lit.</i> , “silent, silence, hush” (Pukui and Elbert 1986:55)
<b>Hanawī</b>	Stream; <i>lit.</i> , “seeking freshwater shellfish” (E. S. C. Handy et al. 1991:110)
<b>Hau'oli Wahine</b>	Gulch, stream, and waterfall in Ke'anae; <i>lit.</i> , “feminine happiness” (Soehren 1963:192)
<b>Ho'okuli</b>	Place name in Ke'anae; <i>lit.</i> , “to feign deafness” (Pukui and Elbert 1986:80)
<b>Ho'olio</b>	Hill used as a marker in Wailua; <i>lit.</i> , “horse” or “horse like”; sometimes the noun, <i>lio</i> , is used as a general term for quadrupeds (dogs, pigs, etc.) (Pukui and Elbert 1986:80, 207)
<b>Huo</b>	Astrological name of an unidentified star (Pukui and Elbert 1986:91)
<b>Ka'alani</b>	Place name of trigonometrical station used in geodetic surveys; <i>lit.</i> , “Those about the chief, members of the royal court” (Pukui and Elbert 1986:107)
<b>Ka'aunaku</b>	<i>'Ili 'āina</i> ; <i>lit.</i> , “separate” (Soehren 1963:194)
<b>Kahukahu</b>	Trigonometrical station located on northeast Ke'anae Park; <i>lit.</i> , “dedicate with prayer” (Soehren 1963:192)
<b>Kake'e</b>	<i>'Ili 'āina</i> ; <i>lit.</i> , “abrupt turn” (Soehren 1963:194)
<b>Kaki'i</b>	Land area name in Wailua; <i>lit.</i> , “to strike at, aim at, smite” or “to brandish threateningly, as in a war club” (Pukui and Elbert 1986:120)
<b>Kala'alaea</b>	<i>'Ili 'āina</i> in Wailua; <i>lit.</i> , “remove red ochre” (Soehren 1963:194)

Name	Translation/Association
<b>Kaleiomanu</b>	Stream in upper Ke‘anae Valley; <i>lit.</i> , “a <i>lua</i> fighting stroke” (Pukui and Elbert 1986:122)
<b>Kalihi</b>	<i>Ili ‘āina</i> in Wailua; <i>lit.</i> , “the edge” (p. 77)
<b>Kali‘i</b>	Land area <i>makai</i> of Pauwalu; the act of hurling spears at a chief as he landed from a canoe, in order that he might exhibit his dexterity and courage in dodging them, almost ritualistic (Pukui and Elbert 1986:123)
<b>Kaluanui</b>	Ditch and <i>heiau</i> ; <i>lit.</i> , “the big pit” (p. 79); the pig god, Kama-pu‘a, was born here, as a foetus; he was thrown away by an older brother but rescued by his mother, Hina (Westervelt in Pukui et al. 1974:79)
<b>Kalunapuhi</b>	<i>Ili ‘āina</i> in Wailua; <i>lit.</i> , “the high place” (Soehren 1963:194)
<b>Kama‘ino</b>	Trigonometrical station and ridge in Ke‘anae; <i>lit.</i> , “naughty child” (p. 80)
<b>Kamilo</b>	Point, stream, and <i>heiau</i> ; <i>lit.</i> , “the <i>milo</i> tree” (p. 81)
<b>Kano</b>	Stream and falls in upper Ke‘anae; <i>lit.</i> , “large, hard stem (as on a banana bunch)” (Pukui and Elbert 1986:129)
<b>Ka‘ōiki</b>	Place name in upper Pauwalu; <i>lit.</i> , “small thrust” (p. 86)
<b>Kapa‘akea</b>	Land division and stream in Ke‘anae; <i>lit.</i> , “the coral/limestone surface” (p. 86)
<b>Kāpae</b>	<i>Ili ‘āina</i> in Ke‘anae; <i>lit.</i> , “to set aside/deviate from” (Pukui and Elbert 1986:131)
<b>Kapā‘ula</b>	Trigonometrical station between Waiohue and Pa‘ea stream, boundary marker between Ke‘anae and Wailua Ahupua‘a; <i>lit.</i> , “the red enclosure” (p. 89)
<b>Kaulanamoā</b>	Place name on Ke‘anae flats; <i>lit.</i> , “chicken roost” (Soehren 1963:192)
<b>Kaulani</b>	<i>Mauka</i> lands in Ke‘anae flats; <i>lit.</i> , “to rely on/support the chief” (Pukui and Elbert 1986:136)
<b>Kaumakani</b>	Hill forming the boundary of Wailua; <i>lit.</i> , “place (in) wind” (p. 94)
<b>Kauwalu</b>	Islet; <i>lit.</i> , “eight landed” (Soehren 1963:192)
<b>Kawe‘e</b>	Point of Ke‘anae Park; no translation, formerly named Kahukahu, <i>lit.</i> , “to offer food and prayers to a god, or to the spirit of a dead person” (Pukui and Elbert 1986:114)

Name	Translation/Association
<b>Ke‘anae</b>	Land section, village, stream, point, valley, peninsula; <i>lit.</i> , “the mullet (fish)”; here, the god Kāne, accompanied by Kanaloa, thrust his <i>kauila</i> staff into solid rock, and water gushed forth (p. 103)
<b>Ke‘anae Uka</b>	Land section; <i>lit.</i> , “upland Ke‘anae” (p. 103)
<b>Ke‘elaimaka</b>	Land section in upper Ke‘anae; <i>lit.</i> , “fascinates the eyes” (Soehren 1963:192)
<b>Keōpuka</b>	Islet; <i>lit.</i> , “the perforated sand” (p. 109)
<b>Kī‘apu</b>	<i>‘Ili ‘āina</i> ; <i>lit.</i> , “ti-leaf drinking cup” (p. 109)
<b>Ki‘inemakua</b>	<i>‘Ili ‘āina</i> ; possible mistranslation of Kanemiiku‘e, meaning “dark brown Kāne (god)”; area known for growing <i>olona</i> (Soehren 1963:192)
<b>Ki‘ioli‘olio</b>	Place name in Ke‘anae; <i>lit.</i> , “loud cries of birds” (Soehren 1963:192)
<b>Kīkahō</b>	Small ridge in Kupa‘u; <i>lit.</i> , “to splash” or “to speak/interrupt rudely” (Soehren 1963:148)
<b>Kīkau</b>	Hill forming boundary between Ha‘ikū and Wailua south of Honomanū; <i>lit.</i> , “to give freely and with good will” (Soehren 1963:149)
<b>Kikokiko</b>	Place name in Ke‘anae; <i>lit.</i> , “dotted, spotted, or speckled” also “to peck or nibble” (Pukui and Elbert 1986:150)
<b>Kilo</b>	Area near base of Waianu Valley; <i>lit.</i> , “stargazer, seer, to watch closely” (Soehren 1963:151)
<b>Kīpapa</b>	<i>‘Ili</i> in Ke‘anae; <i>lit.</i> , “placed prone (as in a slain warrior)” (p. 112-113)
<b>Koleamoku</b>	<i>‘Ili ‘āina</i> in Ke‘anae; named in honor of the first Hawaiian to learn the use of herbs in healing and was subsequently deified after death (Pukui and Elbert 1986:162)
<b>Ko‘oiki</b>	Land area in Ke‘anae flats; <i>lit.</i> , “small prop or support” (Soehren 1963:192)
<b>Ko‘olau</b>	<i>Moku</i> , gap, stream, ditch, gulch, and falls; <i>lit.</i> , “windward” (Pukui and Elbert 1986:166)
<b>Kūālani</b>	<i>Heiau</i> and trigonometric station above Pu‘uililua; <i>lit.</i> , “sour, as in unclean calabashes that have previously held <i>poi</i> ” (Pukui and Elbert 1986:170)
<b>Kūāpōhaku</b>	<i>‘Ili ‘āina</i> in Ke‘anae; <i>lit.</i> , “turn to stone” (p. 119)



Name	Translation/Association
<b>Kukuiolono</b>	Trigonometric station near Ke‘anae Point; <i>lit.</i> , “light of Lono (god)” (p. 122)
<b>Kūpau</b>	<i>Heiau</i> above the road in Ke‘anae Valley; <i>lit.</i> , “entirely finished” or “fearful, shrinking, rare” (Pukui and Elbert 1986:185)
<b>Lo‘iloa</b>	<i>Ahupua‘a</i> ; <i>lit.</i> , “long taro patch” (p. 133)
<b>Ma‘ino</b>	Land section near Nāhiku; <i>lit.</i> , “defacement” (p. 139)
<b>Makahuna</b>	Land section in Ke‘anae flats; <i>lit.</i> , “hidden point” or “hidden eyes” (p. 140)
<b>Makoloaka</b>	Islet; <i>lit.</i> , “creeping shadows” (Soehren 1963:194)
<b>Mii‘ulu</b>	<i>‘Ili ‘āina</i> in Wailua; <i>lit.</i> , “stiff from exercise” (Soehren 1963:194)
<b>Moana</b>	Land area above Kupa‘u; <i>lit.</i> , “ocean, open sea” (Pukui and Elbert 1986:249)
<b>Mokuhala</b>	Islet; <i>lit.</i> , “pandanus island” or “island passed by” (p. 155)
<b>Mokuhōlua</b>	Islet; <i>lit.</i> , “sled island” (p. 155)
<b>Mokuhuki</b>	Islet; <i>lit.</i> , “pulling island” (p. 155)
<b>Mokumana</b>	Islet; <i>lit.</i> , “divided island” or “divided district” (p. 155)
<b>Nāhiku</b>	Land section, village, ditch, and landing; <i>lit.</i> , “the sevens” in reference to the districts of the area (p. 160)
<b>‘Ōhi‘a</b>	<i>‘Ili ‘āina</i> in Waianu; <i>lit.</i> , “‘ō‘hia tree”, location of two famous springs called Waiakāne and Waiakanaloa, where Kāne thrust his staff into two rocks to procure water for himself and Kanaloa (p. 168)
<b>Pa‘akamaka</b>	<i>‘Ili ‘āina</i> in Wailua; <i>lit.</i> , “close the eye” (Soehren 1963:194)
<b>Pa‘akea</b>	Land section, gulch, and stream; <i>lit.</i> , “coral bed, limestone” (p. 173)
<b>Paehala</b>	<i>‘Ili ‘āina</i> in Ke‘anae; <i>lit.</i> , “row/cluster of pandanus trees” (Soehren 1963:192)
<b>Pāhoa</b>	<i>‘Ili ‘āina</i> or <i>ahupua‘a</i> east of Ke‘anae; <i>lit.</i> , “short dagger” (Pukui and Elbert 1986:300)
<b>Pakanaloa</b>	<i>Heiau</i> in Ke‘anae Valley; Temple of Kahuna Kahekili, rumored descendent of the earliest “gods” (Ashdown 1971:45); upon his death, he was dismembered and distributed among other temples where his remains were deified (Beckwith 1970:48-49)

Name	Translation/Association
<b>Pāku'i</b>	Trigonometric station near shore beneath Wailuanui Catholic Church; <i>lit.</i> , “attached/add on” (p. 176)
<b>Pālaha</b>	Place name where Pōhaku‘oki‘āina is found on brink of Haleakalā Crater; <i>lit.</i> , “spread out/extended/flattened” (Pukui and Elbert 1986:307)
<b>Pālahulu</b>	Stream in Ke‘anae; <i>lit.</i> , “to take all of a fish catch for a chief instead of dividing it” (Pukui and Elbert 1986:310)
<b>Pali Kahekili</b>	Leaping place above Waiohuli Pond in Ke‘anae; <i>lit.</i> , “precipice of Kahekili” (Pukui and Elbert 1986:312)
<b>Paliuli</b>	Cave near Hāna, where Queen Ka‘ahumanu was rumored to have been born; <i>lit.</i> , “green cliff”; a legendary paradise of plenty (p. 178)
<b>Pana‘ewa</b>	<i>‘Ili ‘āina</i> in Ke‘anae flats; named for the legendary home of a <i>mo‘o</i> destroyed by Hi‘iaka (p. 178)
<b>Papihii</b>	Promontory east of Wailuaiki; bears earlier name of Poahonu, <i>lit.</i> , “choked with debris” (Soehren 1963:194)
<b>Pā‘ula</b>	Land area by ocean near Kopili‘ula; <i>lit.</i> , “red enclosure” (p. 181)
<b>Pauwalu</b>	Point near Ke‘anae; <i>lit.</i> , “eight destroyed”; named after a Moloka‘i shark-man who killed seven of a family’s children, until he was caught and killed using the eighth as bait (p. 182)
<b>Pōhakukane</b>	<i>‘Ili ‘āina</i> in Ke‘anae; <i>lit.</i> , “Kāne’s stone” (Pukui and Elbert 1986:334)
<b>Pōhaku‘oki‘āina</b>	Boundary <i>pu‘u</i> marking the corners of the current Makawao and Hāna districts, and the traditional Hāmākua Loa, Ko‘olau, Hāna, Kipahulu, Kaupo, Kahikinui, Honuaula, and Kula <i>Moku</i> ; <i>lit.</i> , “stone dividing land” (Ulukau 2006)
<b>Puakea</b>	<i>Ahupua‘a</i> , <i>‘ili ‘āina</i> , stream and gulch in Ko‘olau; <i>lit.</i> , “white blossom” (Ulukau 2006)
<b>Pueo</b>	Hilltop on west rim of Ke‘anae Valley; <i>lit.</i> , “owl” (Soehren 1963:194)
<b>Pu‘u‘alaea</b>	Peak in Wailua on Halakalā Crater; <i>lit.</i> , “red ochrous hill” (p. 195)
<b>Pu‘u o Koholā</b>	<i>Heiau</i> located in Honomanū; <i>lit.</i> , “hill of the whale” (Ulukau 2006)
<b>Pu‘u Olu</b>	Fishpond at southern end of Pauwalu Point; <i>lit.</i> , “restful place” (Soehren 1963:194)

Name	Translation/Association
<b>Waiaka</b>	Pond; <i>lit.</i> , “reflection water” or “shadowy water” (p. 219)
<b>Waiakamoi</b>	Watershed in Ke‘anae; <i>lit.</i> , “water by the threadfish” (p. 219)
<b>Waianu</b>	<i>Ahupua‘a</i> between Ke‘anae and Wailuanui Streams; <i>lit.</i> , “cold water” (p. 221)
<b>Waiā‘ōlohe</b>	Pond located within Ke‘anae Stream; <i>lit.</i> , “water of, or used by, ‘ōlohe” where ‘ōlohe means bare, naked, or hairless (Pukui and Elbert 1986:285; Ulukau 2006)
<b>Wai‘āpuka</b>	<i>Ili ‘āina</i> in Ke‘anae; <i>lit.</i> , “water coming out” (p. 221)
<b>Wai‘eli</b>	<i>Ili ‘āina</i> in Wailua; <i>lit.</i> , “dug water” (p. 221)
<b>Waikamilo</b>	Stream in Wailuanui; <i>lit.</i> , “water of the <i>milo</i> tree” (Soehren 1963:194)
<b>Waikamoi</b>	Land division, stream, and ridge trail; <i>lit.</i> , “water of the <i>mo‘i taro</i> ” (p. 222)
<b>Wailua</b>	<i>Ahupua‘a</i> and <i>‘ili ‘āina</i> ; <i>lit.</i> , “two waters” (Soehren 1963:194)
<b>Wailuaiki</b>	Stream and land division in Wailua; <i>lit.</i> , “small two-waters” (p. 224)
<b>Wailuanui</b>	<i>Ili ‘āina</i> in Wailua; <i>lit.</i> , “large two-waters” (p. 225)
<b>Waiokilo</b>	Waterfall at base of Waiokamilo Stream in Wailuanui; <i>lit.</i> , “landmark water” (Soehren 1963:194)
<b>Waiokukui</b>	Waterfall on Waiokamilo Stream; <i>lit.</i> , “water of the candlenut tree” (Soehren 1963:194)
<b>Waiokuna</b>	Waterfall on Palauhulu Stream; <i>lit.</i> , “water of <i>kuna</i> (a freshwater eel)” (Soehren 1963:194)

### 2.3.2 Legends of Ko'olau Moku

Oral tradition passed from one generation to the next provides valuable insight into the pre-Contact cultural landscape of Ko'olau Moku. As with many of the named places in the archipelago, there is a rich oral tradition regarding the exploits of the legendary figures of Hawaiian mythology in the region.

The Ko'olau region of Maui was made famous as the part of the island that the demigod Māui chose to ascend to the top of Mauna Haleakalā to capture the rays of the sun-god Lā, in order that Lā would be forced to travel more slowly through the heavens during the day. This action would help his mother, Hina [wife of Akalana], to dry the *kapa* [tapa] that she had beaten out [traditional bark-cloth made of the *wauke* bark]. The eastern gap of the mountain of Haleakalā, named the Ko'olau Gap, was the place the demigod Māui mounted the summit. According to the legend, once Māui ascended the slope, he caught Lā in a noose, beat Lā into submission, and compelled him ever after to travel more slowly (Westervelt 1910:140).

Within the larger *moku* of Ko'olau lies the fertile region of Ke'anae. This region also bears the storied visits of gods and legends that passed through and reside in the region. The waters that feed Ke'anae were said to have been brought forth by the god Kāne, who thrust his *kauila* staff into solid rock to bring forth the waters of Ke'anae, similar to the flows of life giving water he is accredited with creating in a similar fashion in Hāmākua Loa while in the company of Kanaloa (Beckwith 1970:64; Sterling 1998:101). Beckwith (1970:65) further describes the site of this famous watershed in Ke'anae:

Two holes are pointed out just below the road across Ohia gulch beyond Keanae on Maui where Kane dug his spear first into one hole and then into the other with the words, "This is for you, that for me." The water gushing from these apertures is called "the water of Kane and Kanaloa. (Beckwith 1970:65)

According to the historian Samuel Kamakau, cited in Maly and Maly (2001), god-associated accounts in the lands of Pāpa'a'ea, 'O-opu'ola and Ke'anae centered around the god Kāne. Kāne's attributes also included *ka wai ola* – the waters of life, *kalo* [irrigated taro], sunlight, and a manifestation of thunder and lightning. These associations lend themselves to this wet, windswept, and sometimes stormy side of Maui. Kāne's attributes named Kānehekili, Kanewawahilani, Kahoalii, Kauilanuimakehaikalani, among many other gods belonging to the upper and lower strata of the firmament were called "gods of the heavens." The first *kahu* who observed the *kapus* [taboos] of these gods was named Hekili (Thunder). He lived at Pāpa'a'ea, where he was born in a place where thunder claps very loudly, with double claps, and where flashes of lightning smashed to pieces the forest of 'O-opu'ola (found between Hāmākua Loa and Ko'olau Moku) (Maly and Maly 2001:13).

According to Martha Beckwith (1970), Kāne-hekili was the god worshipped by those who claimed an *'aumakua* (family spirit) in the thunder. In the forest uplands within the proximity of the *heiau* "Pakanaloa," erected back of Ke'anae at a place where violent thunderstorms occur, thunder being the divine form of the god Kāne-hekili. This god was said to have been seen in his human form as having one side of his body black and the other side white. Kahekili, the last ruling chief of Maui, was tattooed black on one entire side of his body (termed *pahupū*, *lit.* 'cut in half') to show he belonged to the family of the thunder god (Kirch 2012:248; Maly and Maly 2001:13).



The stream heads in many of the deep valleys in the region also hold a special significance as sacred spaces in Hawaiian traditions. The region of Waikamoi in the uppermost [*mauka*] portions of Kalialianui Ahupua'a and Honomanū Ahupua'a, within the Pi'ina'au Stream valley situated *mauka* of Ke'anae, are lands that represent some of the most significant native forest resources remaining in the Hawaiian Islands. These forests are part of a unique cultural landscape in that the native flora, fauna, mist, rains, water, natural phenomena, and resources were believed to be *kino lau* (the myriad body-forms) of gods, goddesses, and lesser nature spirits of Hawaiian antiquity (Maly and Maly 2001:ii). The reluctance of the *maka 'āinana* (common folk) to venture into these inland sacred spaces is further documented in Honomanū. J. C. Elliott in Sterling (1998:109) provides an account of a *kapu* (taboo) surrounding Honomanū Valley:

I have heard from various sources that there are a lot of burials in the upper part of this Valley and there still seems to be a certain amount of superstition attached to the place; I am told that quite a number of people do not like to be in the Valley after dark, and that the [spirits of] ali'i are said to walk there at such times. (Sterling 1998:109)

The deep valleys of East Maui are not the only geographic spaces with gods and spirits residing within them. Many common features of the landscape such as caves, hills, gulches, and streams are also known to have legendary associations. Another tale tells of a famous shark of Ko'olau called Hi'u (the tail of a fish) (Sterling 1998:109). In *On the Hana Coast*, Youngblood et al. (1983:92) relates the tale:

According to this story, two families in the area used to exchange food, a common practice, the couple living seaside at Ke'anae giving fish and the couple living upland giving garden produce.

One day the woman from the shore gave her sister-in-law on the hillside nothing but a fishtail in exchange for bananas and sweet potatoes. The woman took the fishtail home in her calabash, saying nothing about the scanty trade.

That night both she and her husband dreamed of a shark, and when they woke up in the morning they found a live shark swimming around in the calabash, where only a tail had been the night before.

The excited couple freed the shark in an upland pool and made offerings to it. During a heavy rain, the shark was washed down to the ocean, where ... it lives to this day in an underground cave near Ke'anae wharf. (Youngblood et al. 1983:92)

### 2.3.3 Trails and Access

The initial occupation of this portion of Maui first occurred along the coastal region about AD 1200 (A. E. Haun et al. 2004). Of great importance to the reign of Pi'ilani, and to his subjects, was the creation of a network of roads extending throughout Maui. Each road was laboriously constructed of hand-fitted, adze-trimmed, basalt blocks laid in a mosaic to form paths four to six feet wide. One of these roads extended approximately 60 miles and connected Wailuku with Hāna. Around AD 1480, Pi'ilani's son, Kiha-a-Pi'ilani, had the road extended beyond Hāna: through the Kaupō Gap and across the Haleakalā Crater (Duensing 2005).

According to Fornander, Pi'ilani's son, Kiha-a-Pi'ilani, upon becoming *mo'i* of Maui, devoted himself to the improvement of his island:

Kiha, who thus forcibly succeeded his brother as Mo'i of Maui, had been brought up by his mother's relatives in the court of Kukaniloko of Oahu ... Having, as before related, through the assistance of his brother-in-law 'Umi obtained the sovereignty, he devoted himself to the improvement of his island. He kept peace and order in the country, encouraged agriculture, and improved and caused to be paved the difficult and often dangerous roads over the Palis of Kaupo, Hana, and Koolau – a stupendous work for those times, the remains of which may still be seen in many places, and are pointed out as the “Kipapa” of Kihapiilani. His reign was eminently peaceful and prosperous, and his name has been reverently and affectionately handed down to posterity

Kihapiilani had two wives – Kumaka, who was of the Hana chief families, and a sister of Kahuakole, a chief at Kawaipapa, in Hana. With her he had a son named Kamalalawalu, who succeeded him as Mo'i of Maui. Koleamoku, who was the daughter of Hoolae, the Hana chief at Kauwiki ... with her he had a son called Kauhiokalani, from whom the Kaupo chief families of Koo and Kaiuli descended. Kamalalawalu followed his father as Mo'i of Maui. He enjoyed a long and prosperous reign until its close, when his sun set in blood and disaster (when Kahekili lost to Kamehameha I) (Fornander 1880:206-207).

A 1908 photograph depicts an unknown portion of the *alaloo* (long trail) in East Maui, paved with sub-angular and rounded basalt stone as it meanders through thick vegetation (Figure 14). This *alaloo* (or “long road”) was studied and described by anthropologist Martha Foss Fleming as follows:

... the method of building this paved roadway consisted of a line of men standing from the sea and handing stones one to the other until they reached the required place. Here the stones were placed into position. The trail was paved with flat, hard beach stones. (Fleming 1933:5)

Sections of the trail remained at Ka'elekū and between Wailua and Ke'anae in the 1930s (Fleming 1933:5). At the turn of the century, in the early 1900s, portions of the trail remained usable between Nāhiku, Kailua and Halehaku (Dodge 1916:347).

Maly and Maly (2001:398) further note that in addition to *alaehele* (trails) and *alaloo* (regional thoroughfares) that extend generally parallel to the shoreline, there were also trails that connected the near shore areas with the uplands in each *ahupua'a*. In this fashion the *ahupua'a* and *moku* were connected to each other, while also containing roads that enabled access to the *'ili*, *lele*, and other constituent small-scale land divisions within the individual *ahupua'a*.

### 2.3.4 Agriculture and Habitation

The earliest estimation of the initial occupation of East Maui highlights settlement along the coastal region about AD 1200 (A. E. Haun et al. 2004). The abundance of traditional land divisions and place names between Hāmākua Loa and Hāna are suggestive that this period of habitation was extensive after initial establishment. C. E. S. Handy (1940:109) observed that “the minute *ahupua'a* characteristic of this coast indicates a dense population.”

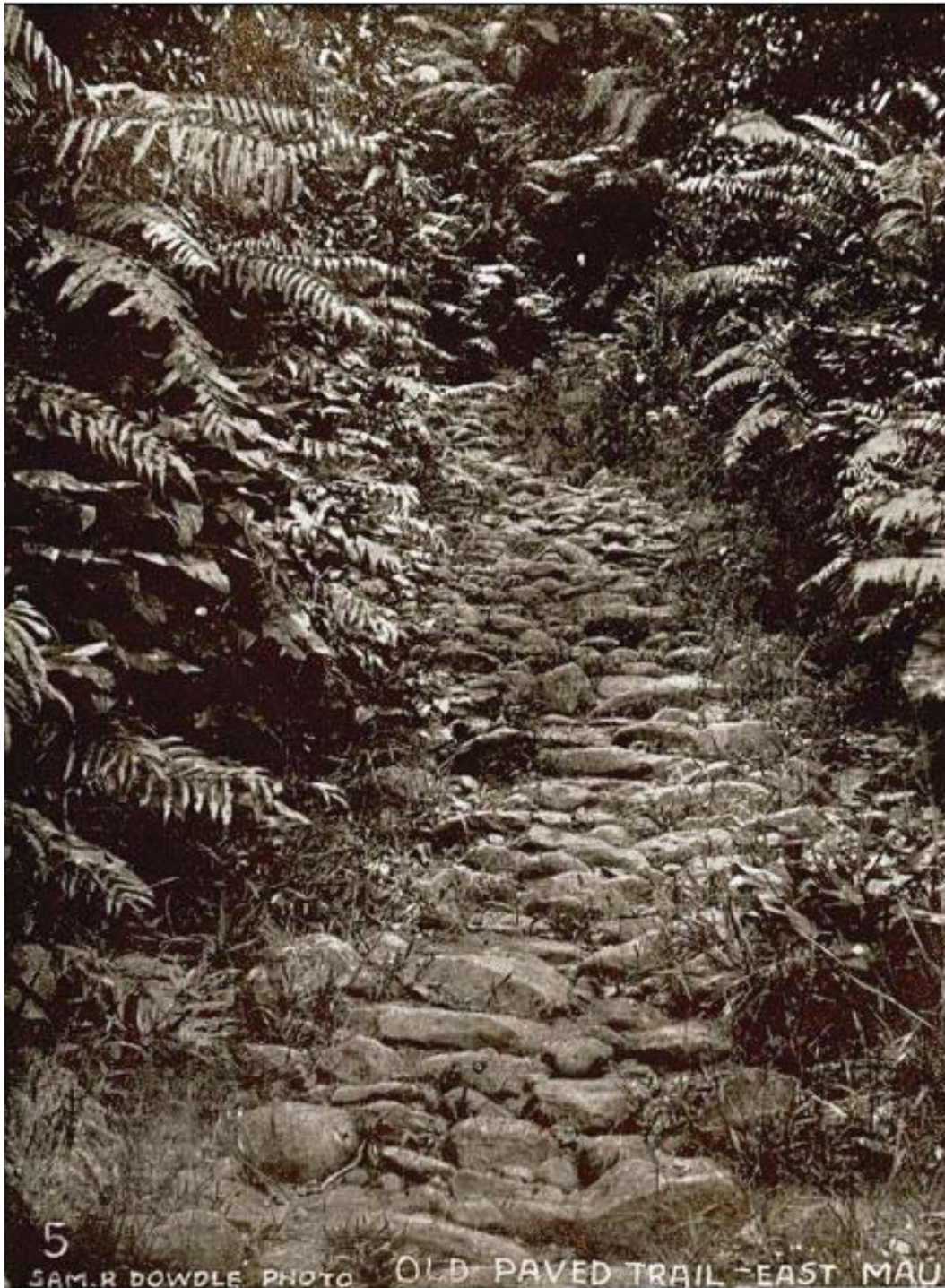


Figure 14. 1908 photograph by Sam Dowdle of a section of the Pi'ilani Alaloa, the King's Highway, as it appeared in East Maui



E.S. Craighill Handy provided some of the earliest observations of habitation and cultivation within the Hāmākua Loa Moku. Sterling (1998:100) relates observations made by Handy regarding cultivation near perennial watersheds in Peahi:

Shallow Kuiaha Gulch was not explored, but its stream must have watered a few taro patches on flats near the sea. According to Henry Ikoa and George Akiu, there were small terraced areas watered by Hoolawa, Waipio, Hanehoi, Hoalua, Kailua, and Nailiilihaele streams. These all have abundant water, but flow in deep gulches having practically no flatland suitable for terracing. Presumably stream taro used to be planted along the beds of these water courses well into the uplands, and forest taro throughout the lower forest. (Handy in Sterling 1998:100)

Cultivation in this region was not entirely dependent on perennial water and further utilized dry-zone agriculture on the slopes of Haleakalā above the coast. Sterling (1998:101) references Handy's account from local informants:

On eastern Maui the semi-dry slopes of Hamakua must have been planted with sweet potatoes by the people living along the coast from Maliko to Waipio. Samwell says, probably referring to this region: "This island is mountainous, the sides of the hills are covered with trees, from thence to the water side are large open plains on which stood their houses and where they have their plantations of sweet potatoes, taro, etc." (Handy in Sterling 1998:101)

Within this area there are also several *heiau* that appear associated with agricultural practices (see section 2.3.5 Heiau, for more detailed discussion) and rituals. This seems suggestive of the extent of traditional cultivation practices within Hāmākua Loa where both wetland and dryland techniques were utilized to maximize food diversity and harvests and where ceremonial centers like *heiau* would help to ensure the harvests sought by Native Hawaiians. Evidence of similar activities increase the farther one travels east along the coast toward Hānā.

From Ke'anae to Hāna, evidence of Hawaiian cultivation and habitation have been noted extensively. According to Kirch (1996:72), the geologically younger region of East Maui was once densely populated. The fertile volcanic soils in the region of Hāna included extensive tracts of dryland sweet potato (*Ipomoea batatas*) augmented by dryland taro, yams (*Dioscorea* spp.), sugar cane (*Saccharum officinarum*), and breadfruit (*Artocarpus altilis*). Irrigated taro was raised in *lo 'i* [fields] in the narrow valleys. Prior to Western contact, the irrigated taro fields of the Ke'anae Peninsula, the *heiau* at Wai'anapanapa, and the Pi'ilanihale Heiau were each major edifices physically attesting to the importance of the district of Hāna (Kirch 1996:69-71).

Evidence of cultivation in Ko'olau starts as far west as O'opuola Gulch that marks the traditional boundary between Ko'olau and Hāmākua Loa Moku. Sterling (1998:108) references Handy's description of the gulch whos "stream, and likewise Waikamoi, Puohokamoa, and Haipuena streams watered small patches." A little further east, the valley of Honomanū affords yet more evidence of stream cultivation. Honomanū Valley is best characterized as a large stream with a broad deep valley and a good beach for fishing canoes. In ancient times, Honomanū was said to have supported a sizable population. Terrace walls attesting to this were observed by E. S. C. Handy et al. (1991:498):



... as far as the level land goes – a little less than a mile. Above the valley, on elevated flatlands, there used to be some terraces and houses. These upland slopes were doubtless planted with all the plants that flourish where there is much rain, but they were too wet for sweet potatoes. (E. S. C. Handy et al. 1991:498)

Sterling (1998:110) further cites Handy regarding the attributes of pre-Contact Honomanū Valley that made it suitable for such habitation:

This valley anciently supported a large population, having a fishing bay of first rank, and a deep, flat valley bottom watered by a large stream. Only one family still raises taro in the old patches near the sea, but abandoned terraces extends up into the valley. (Handy in Sterling 1998:110)

Additional testament to the productivity of the region comes from neighboring Nuua'ilua Stream to the east, such that “This smaller, flat-bottomed valley between Honomanū and Ke‘anae, now uninhabited, was formerly the site of a settled community which raised wet taro in terraces” (Handy in Sterling 1998:111). Continuing east of Nuua'ilua Stream, the region of Ke‘anae offers abundant evidence of traditional Hawaiian subsistence activities.

The accepted pre-Contact settlement pattern for the region of Ke‘anae and Wailua Nui centers on the series of occupational episodes that utilized the Palauhulu Stream for taro (*Colocasia esculenta*) cultivation. A cultural landscape study by Group 70 International et al. (1995) recorded the intensive use of the Ke‘anae and Wailua Nui region for taro, identified three separate field systems, and noted the processes by which community cooperation led to the field system operation. Studies of the history of land use indicate that flat and terraced lands within Ko‘olau Moku were intensively and continuously used for wetland taro cultivation or *lo‘i* agriculture from the pre-Contact era through the present day (Group 70 International et al. 1995; E. S. C. Handy et al. 1991). In regards to pre-Contact development, C. E. S. Handy (1940:109-110) states:

In the extensive confines of Keanae Valley ... the old Hawaiians planted a great deal of dry- or forest-land taro; but it was only in the lower part of the valley, on the eastern side, that wet patches were developed, although a vast area in the remainder of the valley might have been capable of such development...It is on the broad flat peninsula of lava that extends for nearly a mile into the sea from the western line of the valley, that Keanae’s famed taro patches are spread out in striking evidence of old Hawaii’s ingenuity. (C. E. S. Handy 1940:109-110)

According to traditional accounts, Ke‘anae Valley was made suitable for agriculture by the hands of Native Hawaiians in service of their chief, thus providing testament to long-term habitation planning in pre-Contact times. C. E. S. Handy (1940:110) relates the tale:

Anciently, according to Henry Ikoa, the peninsula was barren lava. But a chief, whose name is not remembered, was constantly at war with the people of Wailua and determined that he must have more good land under cultivation, more food, and more people. So he set all his people to work (they were then living within the valley and going down to the peninsula only for fishing), carrying soil in baskets from the valley down to the lava point. The soil and the banks enclosing the patches were thus, in the course of many years, all transplanted and packed into place. Thus did the watered flats of Keanae originate. (C. E. S. Handy 1940:110)

It seems that the expansion into the valley floor may have been prompted by population pressure, hence the chief's desire to increase food yields and insulate against the periodic famine common to Maui and Hawai'i Island cultivation. Evidence of these famine cycles are seen in Honomanū Valley in the form of a *ka imu ki*, or *tī* leaf oven, used during times of shortage to render grated *tī* root into an edible famine food (C. E. S. Handy 1940:206).

Additional evidence of habitation within Ke'anae comes from the presence of a derelict fishpond, Pu'u Olu Pond, situated just off of Pauwalu Point (C. E. S. Handy 1940:208). In addition to the pond, there is also a habitation site closely associated with it, and the terrace comprising the platform of the residence is within a few feet of the Pu'u Olu Pond (C. E. S. Handy 1940:209). This residence shares a boundary wall with the pond and commands a view of a nearby natural arch beneath Pauwalu Point. A second platform, designated as a foundation for another thatch house, was observed on a slope of Paepaemoana Point. This foundation had its inner area paved with rough cobbles, with the exception of a smaller area delineated with larger stones containing finer internal paving between them (C. E. S. Handy 1940:210). It seems likely that the difference in paving within the inner areas reflect different spatial uses of the foundation.

East of Ke'anae are the terraced areas of Wailua, ranging between the boundaries of Wailuanui and Wailuaiki. C. E. S. Handy (1940:110) noted that:

Wailua-nui has even more extensive terracing than Keanae, sloping seaward from the base of the cliff around which the road winds. About half of the terraces are still cultivated by Hawaiians. On the whole, Wailua is today richer agriculturally than Keanae. Wailua-iki, Waiohue, and Hanawai Streams supported small terraces on diminutive flats near the sea. (C. E. S. Handy 1940:110)

The agricultural development of this region is attested to by the presence of at least four *heiau*. Two of these ceremonial structures, Heiau of Ohia (Walker Site 94) and Kaluanui Heiau (Walker Site 95), were identified within a third of a mile from the sea and were designated as agricultural in their associations and uses (Walker 1931:169-170).

The last of the intensified cultivation and habitation areas on East Maui before reaching Hāna is the Nāhiku region. This land area encompassed the *ahupua'a* from Kaliae to 'Ula'ino and their accompanying watersheds. According to E. S. C. Handy et al. (1991), Nāhiku was a fertile *ahupua'a*, which was cleared and terraced with irrigated taro cultivated in the tradition of Native Hawaiians. In ancient times, the settlement at Nāhiku spread over gently rising ground above the shore with a number of groups of *lo'i* watered from Makapipi Stream (E. S. C. Handy et al. 1991:501). There was a *hala* forest along the shore that extended from 'Ula'ino to Hāna (Wenkam 1970). The region above Nāhiku was traditionally forested with native trees such as *koa*, *ohia lehua*, and sandalwood. According to Handy, many plants that were used for native medicine also grew there (E. S. C. Handy et al. 1991:501). In regards to the Nāhiku region C. E. S. Handy (1940:175) states:

Nahiku has a number of terraces, some still under cultivation, below the village. The people of this genuinely Hawaiian community also cultivate dry taro patches about their houses.

Throughout wet Koolau, the wild taro growing along the streams and in the pockets high on the canyonlike walls of the gulches bespeaks former planting of stream taro

along the watercourses, on the sides of the gulches, and in the forest above. The same is true of the wild taros seen here and there in the present forest above the road and in protected spots on what was formerly low forest land, now used as pasture. (C. E. S. Handy 1940)

These lands represent the last significantly sized portion of agricultural land before reaching Hāna Moku. The area between the two was sparsely populated, but evidence of cultivation on a smaller scale exists in this area as well. According to C. E. S. Handy (1940:111):

From Ulaino to Hana extends a *hala* forest, growing upon recent lava flows which cover the coast from Ulaino to Hana Bay. At Ulaino and Honomaele there are a number of places where dry taro is still planted by Hawaiians together with other small subsistence plantings. Formerly there was scattered planting all along the coast and forest plantations inland, between Ulaino and Nahiku, which are connected by an old trail crossing the lowlands near the coastline. (C. E. S. Handy 1940:111)

Thus even the regions considered too arid for *lo'i* cultivation still supported sporadic small scale cultivation of subsistence crops by isolated families. By looking at the spatial associations of cultivation, habitation and access to sites of significance to traditional Hawaiians (i.e., access trails, fish ponds, and *heiau*) a clear pattern of intensive, predominately coastal, occupation is seen throughout the lands of Hāmākua Loa and Ko'olau Moku.

### 2.3.5 Heiau

A *heiau* was a large ceremonial structure accompanying most larger pre-Contact Hawaiian settlements. The name literally means “place of worship” (Pukui et al. 1974:44). The *heiau* structure was an architectural feature as well as social institution of Hawaiian society and like many social institutions has served several functions over time. How *heiau* were used depended largely on the communities they served, the times during which they were actively built and used, and the types of subsistence practiced by the Native Hawaiians who used them. In *On the Road of the Winds*, Kirch (2000:290, 295) cites water availability and ecosystems as two significant primary factors affecting the development of *heiau* use:

The older islands of Kaua'i, O'ahu, Moloka'i, along with the western half of Maui, display deeply weathered and dissected landforms, with valleys and permanent streams well suited to irrigate terrace agriculture... In striking contrast, geologically younger East Maui and Hawai'i - while they account for 74 percent of the total land area - mostly lack permanent streams and have large tracts of young lava flows. (Kirch 2000:290)

Kirch (2000) stresses the relationship of these ecosystem characteristics to political and social organization in the archipelago through the production of agricultural surplus:

Irrigation works in the western isles, and dryland field systems in the eastern group, both constitute forms of landesque [*sic*] capital intensification, but with rather different socioeconomic outcomes... With irrigation, higher yields could be produced per unit of labor and greater surpluses could be extracted by the chiefs. In the dryland regions, greater labor inputs were required and the limits of

intensification were more quickly approached, making the extraction of a surplus that could be put to political use more contentious.

Two contrastive pathways to political (and ideological) transformation emerged. The chiefly elite of the western islands invested heavily in irrigation works, while their religious system emphasized Kane, god of flowing water and procreation. On Maui and Hawai'i Island, in contrast, the chiefs exercised a cycle of territorial conquest, promulgating a legitimating ideology based on the cult of Ku, a human sacrifice demanding god of war, who seasonally alternated with Lono, god of rain and thunder. (Kirch 2000:295)

The dependence on naturally existing streams for the creation of their agricultural surplus had a strong influence on scarcity and ultimately the stability of the local chiefdoms due to wet-dry fluctuations of the streambed. This, in turn, had an effect regarding which god or godly attribute was worshipped and honored at the *heiau* sites. This is reflected in the Makahiki religious cycles of Maui and Hawai'i Islands, where the war god (Kū) reigns for the eight driest months of the year, yielding to the agricultural god (Lono) of thunder and rain for the remaining four-month long wet season of cultivation (Kirch 2012:251-254). Since Hawaiian chiefdoms were dependent on the production of a surplus to support a non-laboring class such as the *ali'i*, in the event of the loss of “the continued ability of a system to yield sufficient surplus, chiefly power was undermined. When such conditions did arise ... a considerable struggle for power ensued” (Kirch 2000:323). In this manner, the limitations of the dryland agricultural systems of the eastern archipelago helped to develop a strong tradition of war and contention mingling with seasonal periods of ceremonial peace. Reflecting these cycles, *heiau* were constructed for both agricultural and political purposes, both of which were important to the peoples of the drier eastern islands.

As a younger island with fewer perennial watersheds, Maui was steeped in many struggles between warring chiefs before the archipelago was ultimately unified under Kamehameha I, the last of the invading chiefs from Hawai'i Island. Thus, many *heiau* were built upon the island of Maui along its northeastern shore, a route routinely used by both Hawai'i and Maui Island armies in their long struggle to gain control of the wet Hāna region of East Maui, one of the wettest and most productive regions between the two islands. In this respect, *heiau* were a necessary institution to legitimize the rule of any reigning or conquering chief. In *A Shark Going Inland is My Chief*, Kirch (2012:229) elaborates:

New systems of ideas and beliefs—such as those of kings as divine beings—get actively reinforced through the use of ritual symbols ... especially in ritualized public displays... The increasingly elaborate *heiau* rituals, carried out by full time priests on the impressive stone platforms, served to reinforce further the power and prestige of the chiefs and king. (Kirch 2012:229)

Despite this observation, *heiau* were not only intended for the use of chiefs and kings in establishing their legitimacy. Kamakau, cited in Kirch (2012:213), relates that “Heiaus were not all alike; they were made of different kinds according to the purpose for which they were made.” Among these alternate types are the smaller coastal enclosures serving as *ko'a* (shrine) for fishermen, the *heiau ho'o'ulu'ai* located further inland for assuring crop fertility, and longer and later-built double court *heiau* which were usually much larger constructions with an elongated terrace overlooking a second lower-level terrace (Kirch 2012:213).



One of the earliest studies of Native Hawaiian architecture was conducted by Winslow Metcalf Walker (1931) on Maui in 1928 and 1929. In this study, Walker compiled and expanded upon the earlier works of Thomas G. Thrum (1909b) and J.F.G. Stokes (1916), in addition to completing a survey of Maui Island for the Bernice P. Bishop Museum (Walker 1931). By the time that Walker conducted his survey, many of the *heiau* previously observed on East Maui had been reduced in number from 182 to 134, citing that many structures had been destroyed by the cultivation of the sugarcane and pineapple industries (Walker 1931:97). In *Archaeology of Maui*, Walker (1931:97-98) details novelties of the *heiau* he observed:

No two of them are built according to the same plan, but the general appearance of many is similar. The *heiau* are all quite simple in construction, native rock from the vicinity are used without any attempt at cutting or facing. Platforms are built by extending the natural level of some hill or eminence of ground and thus producing a solid rock filled platform with a sheer or terraced front. (Walker 1931:97-98)

The largest of these terraced *heiau*, Pi'ilanihale (Walker Site 102) located in Hāna, is the largest in the state and is built over a large bluff, contributing to its massive 15-meter profile (Walker 1931).

About AD 1450 Pi'ilanihale was built at Honomā'ele near Hāna. The name of the structure translates to "Home of Pi'ilani" and likely refers to the *heiau* as the royal residence of the Pi'ilani Family, a long and storied dynasty of Maui chiefs from the sixteenth century (Sterling 1998:123). In *Sites of Maui*, Sterling (1998:123) cites Walker's plan view map (Figure 15) and describes the impressive structure:

It is a stone platform 340 x 415 feet terraced in several steps on the north and east sides. The north slope is the highest seen anywhere, five step terraces built up to a height of 50 feet from the bottom of the hill. The south and west sides are enclosed by a great wall 10 feet high and 8 to 10 feet thick... The only structures found [on top] were the low walls indicated in the plan... The top appeared to be entirely paved with small pebbles and chunks of lava. A few pieces of coral were found. A house site is located just beyond the west wall, and the ruins of other structures in the cane fields below indicate all that is left of a former village. (Sterling 1998:123)

Due to its striking features and large scale Pi'ilanihale is currently preserved within the Kahanu Garden pandanus forest in Hāna.

Of the 230 structures that Walker surveyed on Maui, 39 of the recorded *heiau* (Walker sites 64 through 102) were documented near the License Area of the current project and are depicted in Figure 16 and listed in Table 3. Walker (1931) identified 20 of the 39 *heiau* within the combined Hāna and Makawao Districts, leaving 19 of the *heiau* as either unidentified or presumed destroyed.

Of the 39 documented *heiau* in the region, only one has been reported as being within the License Area. This *heiau* is named Pu'u o Koholā and was presumed to be located within the current Honomanū License Area. According to Walker (1931), this site was not observed during his survey of Maui Island, thus not much can be said regarding its structure, size, or ceremonial purpose (Sterling 1998:109).

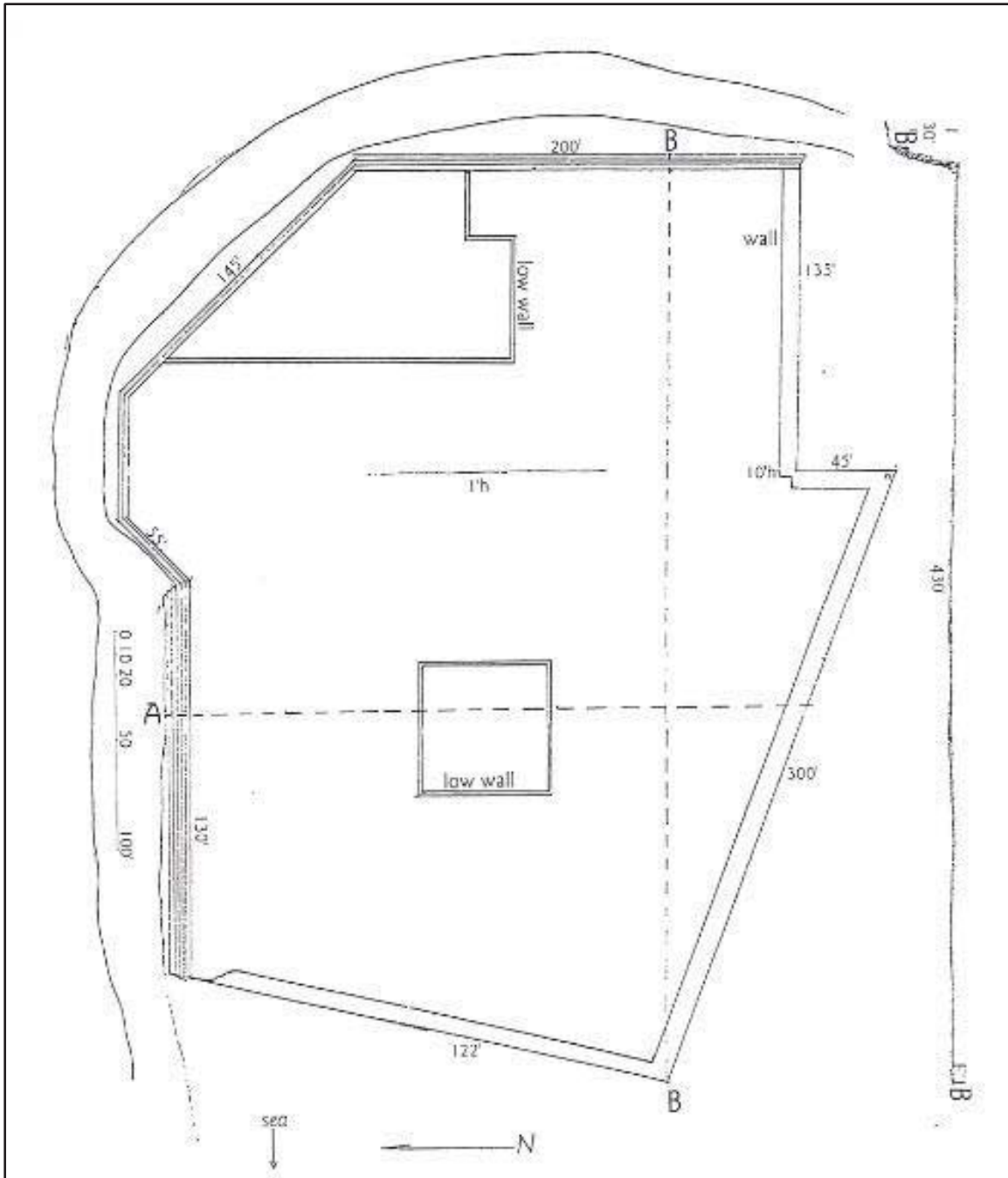


Figure 15. Walker's plan view map of Pi'ilanihale Heiau, reprint from Sterling (1998:123)



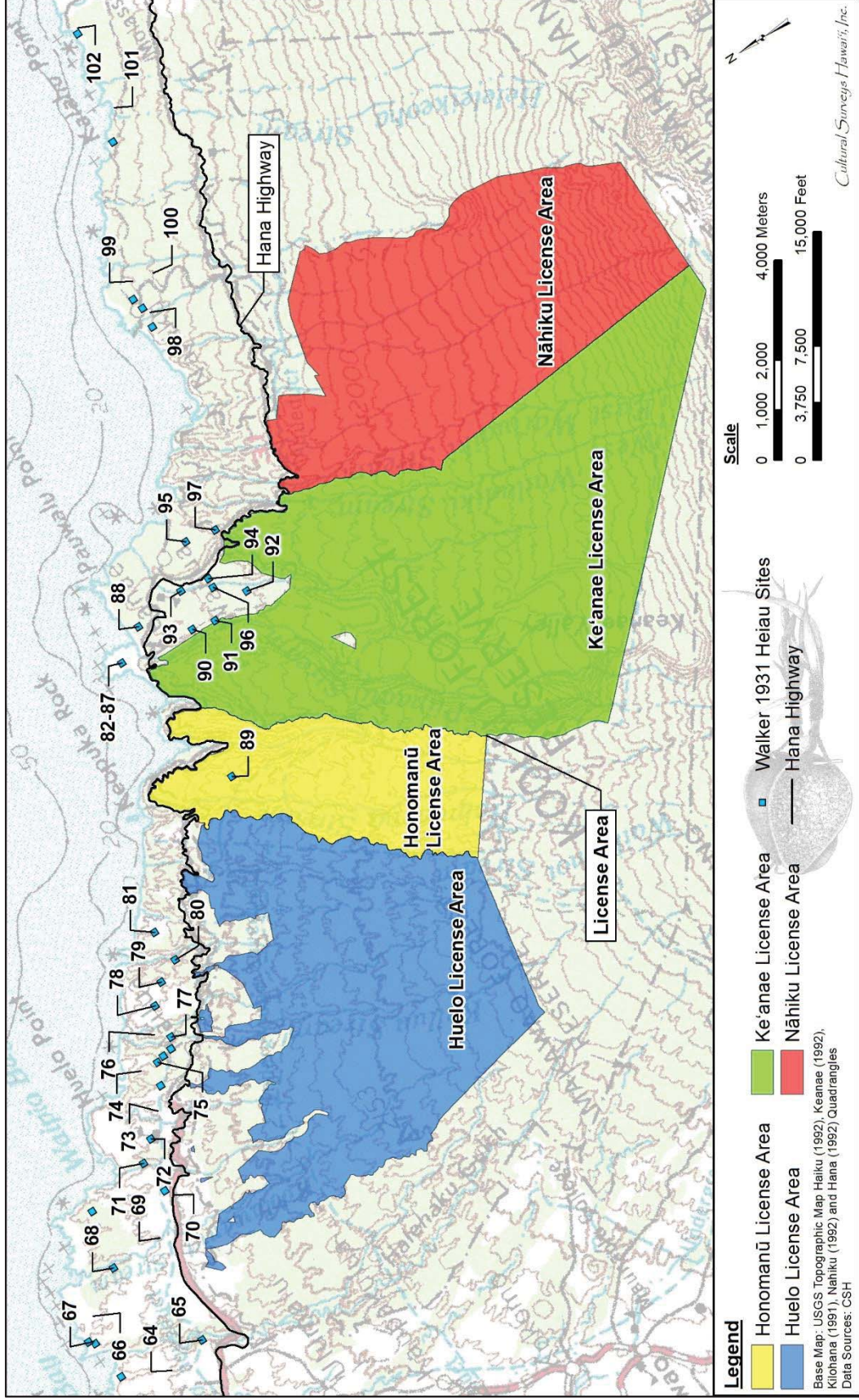


Figure 16. Portions of the 1992a Haiku, 1992c Keanae, 1991 Kiloohana, 1992d Nāhiku, and 1992b Hana U.S. Geological Survey 7.5-minute topographic quadrangle series showing Walker heiau sites 64 through 102 with overlay of project License Areas (U.S. Geological Survey 1991, 1992a, b, c, d)

LRFI for Nāhiku, Ke'anae, Honomanū, and Huelo License Areas, Multiple Ahupua'a, Makawao and Hāna, Maui

TMKS: [2] 1-1 (various plats and parcels), 1-2-004:005, 007 (por.), and 2-9-014:(various parcels)

Table 3. Walker Heiau Sites Located Near the License Area, as Documented in Sterling (1998)

Walker Site No.	Name	Ahupua'a	District	Adjacent Watershed	Description per Walker (1931)
64	Mokahio	--	--	--	Irregular <i>heiau</i> , terraced on several sides; walls and terrace facings measure 130-x-60-x-35-x-50-x-20-x-50-x-55 ft; greatest distance front to back of 85 ft; constructed of waterworn stones and pebbles; interior disturbed; outline follows hill contour; on top of a small knoll within a gulch a quarter mile from the sea (p. 102)
65	Kaapahu at Kakipi	--	--	--	Destroyed
66	Unknown	--	--	--	Moderately sized <i>heiau</i> ; north side measures 128 ft, east side 120 ft; 68 ft from northeast corner a wall divides the <i>heiau</i> in two; back wall measures 115 ft; front wall facing is 4 ft high; north and west sides terraced in two to three steps; no coral or pebbles seen; partly destroyed to plant pineapples; on a bluff above Halehaku Bay, 50 yards from the sea (p. 103)
67	Puilani	--	--	--	Massive beach rock <i>heiau</i> ; 10 ft high, 60 ft wide; 2 ft terrace forms rear wall against hill; terraced on front; oriented parallel to the shore for 150 ft; interior once paved, now heavily overgrown; no coral found; numerous enclosures at hill base indicating a past village site; on shore of Halehaku Bay, 50 yards from the sea (p. 103)
68	Poohoolewa Heiau	Honopou	Makawao	Hoolawa	Large walled <i>heiau</i> , possibly sacrificial class; 300 ft long, 130 ft wide at front; large 200 ft open court off front wall; remaining 100 ft divided into two 50 ft enclosures with walls 5 ft high and 6 ft thick; constructed of beach stones, pebbles, and basalt; western side collapsed to permit



Walker Site No.	Name	Ahupua'a	District	Adjacent Watershed	Description per Walker (1931)
69	Puuokaupu Heiau	Honopou	Makawao	Hoolawa	planting of pineapples; at Apiapi on high bluff beyond Honopou Gulch to the east (p. 105) Destroyed
70	Mokupapaaku a Heiau	Honopou	Makawao	Mokupapa Gulch	Destroyed
71	Oanapele Heiau	Waipioiki	Makawao	Waiopio	Measures 60-x-100 ft, has terraced face 10 ft high; structure was demolished to provide stone for the road; at Pu'uoneone, 200 ft north of school and main road (p. 105)
72	Puuokalepa Heiau	Waipionui	Makawao	Waipionui	Outline indicates 65-x-100 ft <i>heiau</i> ; front is faced 20 f. high against hillside; Stokes (1916) reports it as sacrificial class; 800 ft east of protestant church, atop small hill above steep unnamed gulch (p. 105)
73	Kupaikaa Heiau	Hanehoi	Makawao	Hanehoi	Large <i>heiau</i> ; 48 ft high wall on east side, 94 ft high wall on north side; northwest corner 20 ft high, built of three terraces; partly washed out from irrigation ditch failure; Drums heard from this heiau; at Hinalakahi on hillside below Kailua ditch, west of Kailua Protestant Church (p. 105)
74	Pohakuokaia Heiau	West Hanawana	Makawao	Hanawana	Notched-shaped <i>heiau</i> ; measures 60-x-30-x-20-x-12-x-28-x-50 ft; basalt walls 3 ft high and 6 ft thick; constructed of beach stones, no coral or pebbles seen; at Hoalua, below church, on bluff near end of pineapple field (p. 106)
75	Honomauloa at Hanawana	East Hanawana	Makawao	Hanawana	Destroyed

Walker Site No.	Name	Ahupua'a	District	Adjacent Watershed	Description per Walker (1931)
76	Halepaahau at Hanawana	Papa'a'ea	Makawao	Nailiilihaele	Destroyed
77	Kauhihale Heiau	Papa'a'ea	Makawao	Kailua	L-shaped <i>heiau</i> with walled enclosure; measures 200 ft long and 137 ft wide; two to three terraces on sides; northeast corner is triple terraced 10 ft high; 38-x-22 enclosure in northwest corner; constructed of rough basalt, no coral or pebbles; at Moii in Pu'uomaile, <i>mauka</i> of road, opposite of store (p. 106)
78	Pohakuokane?	West Makaiwa	Makawao	Nailiilihaele and Puehu	Small notched-shaped <i>heiau</i> ; measures 66-x-36-x-32-x-6-x-32-x-36; walls are 4 to 6 ft thick and 5 ft high at corners; constructed of waterworm basalt rocks; in dense <i>hau</i> thicket on ridge, east of Kailua Gulch, below road (p. 107)
79	Halekanalao at Papea	West Makaiwa	Makawao	Puehu	Destroyed
80	Kalaeohia at Papaeaiki	East Makaiwa	Hāna	O'opuola	Destroyed
81	Nakeikiikalalo makaiwa at Makaiwa	East Makaiwa	Hāna	Ka'aiea	Destroyed
82	Kukuionono	Ke'anae	Hāna	Pi'ina'au	Destroyed/not found; on point of Ke'anae Peninsula (p. 109)
83	Lalaola	--	--	--	Destroyed/not found; on point of Ke'anae Peninsula (p. 109)
84	Pakanalao	--	--	--	Destroyed/not found; said to have been a war <i>heiau</i> to Kanehekili; on upper slopes of Ke'anae Peninsula (p. 109)

Walker Site No.	Name	Ahupua'a	District	Adjacent Watershed	Description per Walker (1931)
85	Lelewi at Ko'olau	--	--	--	Destroyed/not found
86	Paliuli	--	--	--	Destroyed/not found
87	Kanekauolono	--	--	--	Destroyed/not found
88	Kamokukupeu	Ke'anae	Hāna	Ohia	Destroyed/not found
89	Puu o Kohola at Honomanū	Honomanū	Hāna	Punalau	Destroyed/not found
90	Kawalimukala at Pauwalu	Ke'anae	Hāna	Pi'ina'au/ Palauhulu	Destroyed/not found
91	Kupau	Ke'anae	Hāna	Pi'ina'au/ Palauhulu	Destroyed; remnant 84 ft terrace wall above road in Ke'anae Valley near ditch trail (p. 109)
92	Kualani	Ke'anae	Hāna	Waiokamilo	Destroyed/not found; on top of west ridge, at Waiokane Falls (p. 109)
93	Kamilo Heiau	Wailuanui	Hāna	Waiokamilo	Small <i>heiau</i> enclosure; measures 22-x-25 ft, walls 3 ft high and 3 ft thick, constructed of basalt stones and pebbles; at Kawaloa in dense <i>hau</i> and <i>puhala</i> grove, north side of stream (p. 112)
94	Heiau of Ohia	Wailuanui	Hāna	Waiokamilo	Dimensions lost, stones removed to build pig pen; likely agricultural <i>heiau</i> , built by chief Kaimuki; at Ohia in the valley, 3/4 mi. from the sea (p. 113)
95	Kaluanui Heiau	Wailuanui	Hāna	Wailuanui	Series of enclosures; measures 15-x-29 ft; south terrace is 11 ft wide; west wall is 6 ft wide and 4 ft high; higher terrace on one side; Stokes (1916) mentions oval pit in terrace pavement near southern end, measuring 6.5-x-4 ft and 2 ft deep; pit not present in 1931; at Kaluanui east of taro <i>lo'i</i> , 1/3 mi. from the sea (p. 113)

Walker Site No.	Name	Ahupua'a	District	Adjacent Watershed	Description per Walker (1931)
96	Kukuiaupuni Heiau	Wailuanui	Hāna	Waiokamilo	Terraced platform; one platform measures 50-x-42 ft and 12 ft tall; second platform measures 47-x-51 ft and 5 ft tall; complex faces north by northwest; 200 ft open space between both terraces; on top of slope at Pauwalua, 300 ft south of road and 500 ft southwest of the school (p. 113)
97	Makehau Heiau	Wailuanui	Hāna	Wailuanui and West Wailuaiki	Upper terrace outlines all that remains; measures 72-x-43 ft and is 5 ft high; water worn stones and pebbles observed on platform surface; said to have once contained two platforms; eight coconut trees growing there were said to have been planted by Kaniho, last <i>kahu</i> of the <i>heiau</i> ; on level land at Makehau, 1/4 mi. from the Wailua road and 150 ft from the Makehau road (p. 113)
98	Kaluakelea Heiau	Ko'olau	Hāna	Makapipi	<i>Heiau</i> measuring 50-x-45 ft; three low terraces at northwest corner, 6 ft high; no coral or pebbles seen; partly destroyed by rubber plantation; at Honolulunui, on ridge west of Makapipi Gulch (p. 114)
99	Pohoula Heiau	Ko'olau	Hāna	Kuhiwa Gulch	Open platform <i>heiau</i> ; measures 72-x-72-x-65-x-64 ft; two terraces form top, the higher one measuring 36-x-25 ft, rising 1 f. above the lower; northeast corner is 8 ft high; east wall is 3 ft high and 4 ft thick; constructed of waterworn stones and pebbles, no coral seen; faces the sea; near Nāhiku village, on east side of Makapipi Gulch (p. 114)
100	Haleaka Heiau	Ko'olau	Hāna	Kuhiwa Gulch	Platform <i>heiau</i> ; 4 ft high in front, 6 ft high wall in back; northwest slope is double terraced; constructed of water worn stones; interior features trampled by cattle and pigs; located on a high hill; on east bank of Makapipi Stream, 300 yards from the school (p. 115)



Walker Site No.	Name	Ahupua'a	District	Adjacent Watershed	Description per Walker (1931)
101	Heiau at Lanikele	Ula'ino	Hāna	Heleleikeoha	Walled <i>heiau</i> ; measures 116-x-90 ft; south and east walls are 6 to 8 ft high, and 12 ft thick; east wall is double terraced; gate on south wall is 8 ft wide, 4 ft high and 12 ft deep, low 2 ft wall closes the interior end; no interior structures noted, only a stone heap; outer terrace paved with pebbles, contained only scattered stone within; perched atop a high shoreline bluff, west of a canoe landing and trail up Lanikele Gulch; may have been a strategic fortification, though not corroborated (p.115-116)
102	Piilanihale Heiau	West Honoma'ele	Hāna	Honoma'ele Gulch	Platform <i>heiau</i> ; platform measures 340-x-415 ft; several (up to 5) terraces make up the north and east sides, up to 50 ft high; south and east sides enclosed by wall 10 ft high, and 8 to 10 ft thick; paved with small pebbles and lava cobbles; no high internal walls or terraces; two low walls observed in northeast corner and center of platform; scattered coral pieces seen; internal features minimally mapped due to vegetation density; house site observed beyond west wall; evidence of remnant village in cane fields below structure; paved road leading up western slope of <i>heiau</i> , possible extension of the Alaloa (Kihapiilani Trail); Largest <i>heiau</i> on Maui and tallest in the archipelago; name means "Home of Piilani," indicating site as possible royal abode of the Piilani family of Maui chiefs, reigning in the 1500s; on a shoreline hill near Kalahu Point (p. 123)

Another account of Pu'u o Koholā comes from Inez Ashdown who places this *heiau* in the vicinity of Kaumahina Wayside Park along the mauka side of Hāna Highway just west of Honomanū. In *Ke Alaloe o Maui: The Broad Highway of Maui*, Ashdown (1971:54) states:

Where the Kaumahina park is now on land of that name, there stood a big temple and around it and its village grew an abundance of bananas, 'ohia-ai, rice and taro all in and around Punalu and above there to Kolea. Four streams above there form waterfalls over the cliffs and flow into Honomanu Bay. Nuailua stream does not reach far up the slope but it once watered large taro lands in olden times (Ashdown 1971:54).

A portion of a U.S. Geological Survey (1992c) map of the Ke'anae region (Figure 17) also confirms the same place-name of Pu'u o Koholā belonging to a local *pu'u* (hill) located south of the Kaumahina Wayside Park in the approximate location described by Ashdown (1971:54).

Within the modern Makawao District, containing the traditional *moku* of Hāmākua Loa, 10 *heiau* were identified. Six of the ten identified structures (Walker Sites 64, 67, 68, 74, 77, and 78) were observed to be largely intact, of a generally larger size than those located east toward Hāna and bore a few distinct features regarding the 'class' of *heiau* documented. Three of the six sites were considered large *heiau* as they each had at least two dimensions near or greater than 100 feet. One of these named Po'oho'olewa Heiau (Walker Site 68) was interpreted as a possible sacrificial *heiau* and had walled exterior dimensions of 300 by 100 ft with an open court stretching out 200 ft from the structure (Sterling 1998:105). The other two large sites include the Pi'ilani Heiau (Walker Site 67) with its long beachfront terrace and remnant village foundations, and the L-shaped Kauhihale Heiau (Walker Site 77) several kilometers to the southeast (Sterling 1998:103,106). Two more *heiau* of interest in this area are Pōhaku o Kāne (Stone of Kāne) Heiau and Pōhaku o Kai'a (Stone of the Fish) Heiau (Walker Sites 78 and 74, respectively), which are smaller sites but documented as unique in their shape with Walker citing six dimensions to outline its surface area (Sterling 1998:106-107). This description is reminiscent of Kirch's *heiau ho'o'ulu'ai* reportedly used to ensure crop fertility, of which one of the two common structural types of this class are defined as having "six sides, so that in plan view they look like a square with a notch removed from one corner" (Kirch 2012:213). The last *heiau* identified by Walker (1931) in the district, Kupaika'a Heiau (Walker Site 73), was interestingly tall (three terraces reaching nearly 20 feet) and may have been in use in modern times as there were transcribed reports of the sound of drums heard coming from its vicinity (Sterling 1998:106-107).

Within the modern Hāna District, containing the traditional *moku* (districts) of Hāna and Ko'olau, 11 *heiau* were identified by Walker (1931). Five of the 11 *heiau* were observed to be largely intact, three of which (Walker Sites 93, 95, and 96) were located slightly inland of the coast and were smaller in that they measured less than 50 ft along any single dimension (Sterling 1998). The two remaining structures are of a significantly larger scale as they are roughly two to six times the size of the smaller *heiau*. One of these is the forementioned Pi'ilanihale Heiau (Walker Site 102) in Hāna. The second is the *heiau* at Lanikele (Walker Site 101) with high stacked walls and

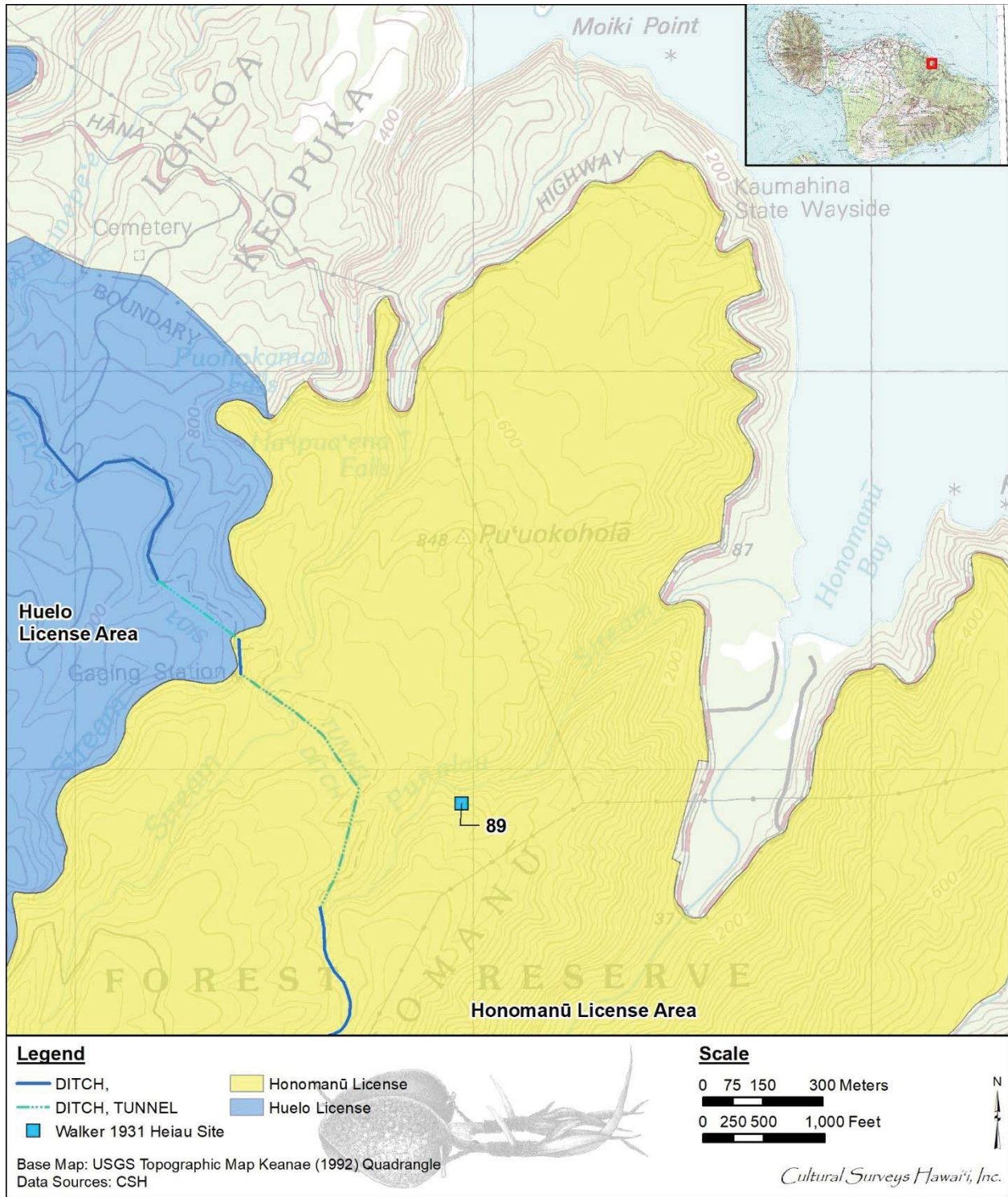


Figure 17. Portion of the Keanae (1992c) U.S. Geological Survey 7.5-minute topographic quadrangle series showing the approximate location of Pu'u o Koholā heiau (Walker Site 89), roughly corresponding to the location of Ashdown's unnamed heiau near Kaumahina Wayside Park



cobblestone paved exterior, thought by Walker to be a fortification due to its perch over a canoe landing 150 ft below it on the shoreline (Sterling 1998:115-116).

Many of the structures that Walker located within Hāna and Makawao Districts were partially damaged from neglect, agriculture, civil projects, or some combination of the three. Modernity impacted the traditional ceremonial structures in a variety of ways. The *heiau* that were observed intact were largely overgrown and unkempt due to the passage of time and the neglect furnished upon them resulting from Native Hawaiians abandoning the old *kapu* religious system with the arrival of missionaries to the Kingdom of Hawai'i in the 1800s. One example of this is Makehau Heiau (Walker Site 97) that was observed largely intact but partially collapsed (Sterling 1998:113). Many of the remaining structures that were either partially intact or missing altogether were unintentionally impacted by the advent of agriculture to the region during the historic period.

Kupaikaa Heiau (Walker Site 73) was partially washed down the hillside it sat upon when the irrigation ditch upslope failed and sent a torrent of agricultural water down the hillside (Sterling 1998:105-106). Haleaka Heiau (Walker Site 100) was largely trampled down into the soil from wandering cattle and pigs grazing in the region (Sterling 1998:115). Some heiau were destroyed intentionally, either for use of their materials or to make way for the development of agricultural pursuits. Kaluakilea Heiau (Walker Site 98) was intentionally destroyed while the Koolau Rubber Company was clearing fields for planting (Sterling 1998:114). Oanapele Heiau (Walker Site 71) was demolished in order to harvest its stone for the paving of local roads (Sterling 1998:105). The combined effect of neglect, the passage of time, and heavy handed agricultural clearing have been extremely detrimental to the longevity of most native Hawaiian architecture, and the state of East Maui's *heiau* stand as a physical testament to that damage. This can be further exemplified by the fact that 19 *heiau* could not be located and were assumed destroyed, comprising 48% of all known sites recorded between 1909 and 1931.

## 2.4 Historic Background of East Maui

### 2.4.1 Early Historic Period (1778 to Mid-1800s)

During the last half of the eighteenth century the high chiefs Kahekili of Maui and Kalani'ōpu'u of Hawai'i participated in battles between Maui and Hawai'i. This period also saw the arrival of the first European explorer, Captain James Cook, on his pan-pacific voyage. This occurrence would inevitably lead to the arrival of even more European explorers, merchant vessels, and missionary passengers across all Hawaiian Islands, including Maui. The interactions between Hawaiians and these newly arrived visitors would come to mark the reshaping of traditional land use patterns in Hawai'i toward the islands we see today.

#### 2.4.1.1 European Explorers

In 1778, when Captain James Cook's ships returned from their North American explorations, they stopped at Hāna and encountered Hawaiians for the first time on board the decks of their ships. This came just before the well-known incident that cost Capt. James Cook his life on Hawai'i Island when he attempted to kidnap Kalani'ōpu'u for use as ransom (Cordy 2000:294).

In December of 1788, William Douglas, commanding the British ship, *The Iphigenia*, arrived at Hāna and continued to sail on to the island of Hawai'i where he presented Kamehameha with a swivel cannon. This cannon was mounted on a large double canoe, together with a number of



muskets and a quantity of ammunition. In his account of Maui from aboard *The Iphigenia*, Meares (1791:335-336) wrote the following passage:

We had no longer appeared off Mowee [Maui] than a great number of canoes came off with hogs, yams and plantains.-On this fide [side] of the ifland [island] there is a large town, the refidence [residence] of Titeeree, the fovereign [sovereign] of Mowee [Maui], who was at this time on a vifit [visit] to Taheo, king of Atooi, in whofe [whose] adfence [absence] the government was left to the care of Harwallanee, brother-in-law to Tianna, of whofe [whose] arrival he was no fooner [sooner] informed, than he ordered a prefent [present] of hogs to the fhip [ship]; but before it arrived Tianna had obferved [observed] his brother of fhore [shore], and having drefsed [dressed] himself in his beft [best] apparel, defired [desired] that meffage [message] a might be fent [sent] to invite him on board.-On his arrival they met as borthers fhould [should] do after a long feparation [separation]; the whole of their conduct to each other was affectionate; they melted into tears, and almoft [almost] drew the fame [same] from the eyes of thofe [those] who held them. After their firft [first] emotions had fubfided [subsided], the chief requefted [requested] Captain Douglas to remain with him for a few days, and engaged to fupply [supply] him with any quantity of provifions [provisions] that might be demanded; but as he faw [saw] no place where they could come to an anchor in fafety [safety], the furf [surf] at the fame time beating with great violence, and an heavy fwell [swell] with the wind blowing in fhore [shore], Captian Douglas was under the neceffity [necessity] of declining the invitation. (Meares 1791:335-336)

#### 2.4.1.2 Battle of Great Canoes

In 1790, Kamehameha then began to muster his armies for a planned invasion of Maui. That summer, Kamehameha landed at Hāna. In a battle known as Kaua o Kawa'anui (Battle of Great Canoes), Kamehameha defeated the Maui advance guard there, after which he sailed for Hāmākua Loa, sweeping the remaining Maui defenders along the coast and back into 'Īao Valley, and annihilating them at the battle called Kaua o Kapaniwai o 'Īao (Battle of the Dammed Water of 'Īao), during which the slain warriors were said to have been so numerous, that they dammed the water of 'Īao Stream. Kamehameha then returned to Hawai'i to settle disputes there. In his absence, both Kahekili and the High Chief of Kaua'i, Kaekulani formed an alliance to retake Hāna. After that success, both chiefs launched an attack on Kamehameha at Waipi'o on Hawai'i, where they were both defeated. After the death of Kahekili in 1793, Kamehameha assumed the rule over all of Maui, through his victory over the High Chief Kahekili's successor, the High Chief Kalanikupule, in the battle of Nu'uaniu on O'ahu in 1795 (McGregor 2007:99).

#### 2.4.1.3 Missionaries

Evidence of a cohesive religious population in East Maui is best described by the first Europeans to visit Ke'anae. From the journal of William Richards (1829) comes information that the region between Honomanū and Wailua was densely populated:

We went on board the canoe, and rowed a few miles, avoiding some difficult *paries* [steep cliffs]. After landing, we walked a few miles further, to Wailua, where we put up for the Sabbath. Very early the morning [of the Sabbath], the horns, summoning

the people to the house of God, were heard in every direction; and we soon perceived that the call had not been heard with indifference. At the early hour, the house was thronged with attentive worshippers. [The next day] we examined the schools, which were large. About 10 o'clock, A.M., the princess [Nahienaena] arrived, and addressed the people; after which, we proceeded on our way [to Hāna]. (Richards et al. 1829:249)

The Hāna region of Maui was known as “one of the most isolated places in these islands, remote and difficult to access” (Bishop 1861). Because of the many treacherous ravines and unpredictable flooding, Native Hawaiians usually rode on horseback to a point before Ke‘anae, then completed the journey to Hāna by canoe. Before the establishment of the Hāna protestant mission in 1837, missionaries reached East Maui no more than once or twice a year. From the early writings of the protestant missionaries in the Sandwich Islands, it appears that the first excursion to Hāna by an American protestant teacher was made in 1823. In regards to this, Richards and Stewart (1825:141) in *The Missionary Herald* write:

...A similar adventure is related by Honorii [Native assistant to the missionaries], in a late visit to the eastern part of the island of Mowee, whither he went in the company of Keoua, wife of Governor Adams. That part of the island [Hāna] had never been visited by missionaries, and Honorii took occasion to preach to them Jesus Christ. He found them wholly uninstructed, and exceedingly attached to their idols, and disposed to resist every argument in favor of a change in their religion. Before he left the place, he ascended a neighboring hill which overhangs the sea on the top of which were several huge stones erected, covered with tapa (native cloth), and dignified with the appellation of gods. With the aid of some of his company, he succeeded in displacing them from their beds, and rolled them into the sea. (Richards and Stewart 1825:141)

The Protestant mission station of Hāna was administered in its early days by the Reverend Mark Ives and his wife, Mary Ann Brainerd Ives. The Ives were protestant missionaries who had both arrived from New England in 1836 (Judd et al. 1969:122). The Ives were joined by the Reverend Daniel Toll Conde and his wife Mrs. Andelucia Lee Conde, who were stationed in Hāna following their arrival in 1838 (Judd et al. 1969:72). The isolated missionary station of Hāna was serviced by the 39-ton schooner *Missionary Packet* which had been built in 1825 at Salem, Massachusetts, for use between the Hawaiian Islands, as well as other schooners and steamships (Mifflin 1983:19).

#### 2.4.1.3.1 *Catholic Missionaries and the Pa‘akaula of 1843*

Protestant missionaries, having a strong presence in Hawai‘i by the early 1800s, had almost exclusive claims to managing the salvation of its inhabitants, but the Catholic Church was soon to follow its protestant fellows to Maui’s shores. Catholic missionaries had found a favorable foothold with a few courtiers of Kamehameha III just a year after he passed the Edict of Toleration in 1839. This Edict allowed religious freedom for all inhabitants of the Kingdom of Hawai‘i. Six years later, the first Catholic missionaries arrived in the busy whaling town of Lahaina and found themselves amid a population receptive to their teachings, despite the fact that many of the *ali‘i*, the protestant missionaries, and the Queen Regent Ka‘ahumanu were outwardly opposed to their presence on Maui (Speakman 1978:87-88). The earliest Maui converts to the recently arrived faith

were two brothers, Helio and Petero Kaoeloa from Wailuku (Schoofs 1978:291). The next generation of catechist converts were soon to follow, especially Helio Kaiwiloa who passionately converted from the fold of the Protestant Church into Catholicism. Helio Kaiwiloa had left East Maui to be officially baptized, shortly before returning to Maui to travel the East Maui districts preaching the Roman Catholic faith (Speakman 1978:87-88).

Helio Kaiwiloa's influence was significant during his lifetime spent preaching in remote East Maui. Robert Schoofs (1978:257) in his *Pioneers of the Faith* describes Helio:

Kaiwiloa assiduously studied his Christian doctrine and shared his knowledge with others. Going from house to house in Kahikinui he was not a little surprised to find many catechumens. He gathered them in a little chapel, where they said their prayers together and took part in the instructions. Kaiwiloa covered several adjacent villages, displaying great zeal in propagating the faith. (Schoofs 1978:257)

The increase in the number of catechumens acquired by Catholics in the Hāna District became a point of concern for Protestant missionaries, and in 1843 they prevailed upon Judge Mahune of Wailuku to send policemen to investigate the activities of Catholics and catechumen, arrest them, and transport them to Wailuku to stand trial. The charges were simple, that Kaiwiloa had gathered the catechumen once weekly in his private home for the purpose of practicing communal prayer. Perhaps perceived as a type of conspiracy, it was deemed unlawful and ordered to be stopped (Schoofs 1978:260).

Eventually the Wailuku police made it to remote East Maui to begin the arrests. In one of the first villages they reached they arrested a half-dozen Catholics and moved onto the next village, gathering a few more of the faithful at every stop along the long road back to Wailuku (Schoofs 1978:260). All along the way additional arrests were tied together to manage the ever increasing crowd of offenders, this is why the procession was named the *pa'akaula* (sometimes *pakaula*), or the "tying, binding with ropes" (Speakman 1978:88). Schoofs (1978:260) then relates the impressive display of solidarity that followed:

The catechumen of Maui had agreed on the following line of conduct. If any Catholic or catechumen were arrested for any crime other than for his religion, nobody would take an interest in the case. But if, however, anyone were arrested for religion's sake, all would declare their solidarity and voluntarily join the arrested one.

This is precisely what was done. Going eastward, the ever increasing band passed through Kaupo and Kipahulu, and continued the journey along the north coast of the island until they reached Wailuku. A striking feature of this procession was that the prisoners were dressed in their Sunday best and were wearing gay floral wreaths. (Schoofs 1978:260)

This large display crossed every major *moku* on their way into Wailuku to stand trial, allowing the procession to preach as they travelled through Hāna, Nāhiku, Ke'anae, Kailua, Ha'ikū, and Pā'ia (Speakman 1978:87). The entire distance travelled by the officers and their prisoners covered close to 90 miles of difficult terrain over the course of a month. There were also periodic rests along the way which afforded the persecuted Catholics time to speak with the inhabitants at their

brief respites and proselytize, gathering more catechumen into their fold as they proceeded (Schoofs 1978:260).

By the time that the procession had reached Wailuku for their trial the crowd was too massive for the courts to handle. Seeing the size of the crowd containing the Catholics and their sympathizers, Judge Mahune bid all the participants to “go home” and dismissed the charges against the Catholics (Schoofs 1978:260). Helio and his catechumen had prevailed against the persecution perpetrated by Protestant influences entrenched in Maui. An unexpected benefit of this persecution was that the number of catechumen on Maui had nearly tripled during the ordeal, bringing the count near a thousand adherents. The faithful Catholics then walked the long road back to their homes lead by Helio Kaiwiloa, spreading their faith along the way (Speakman 1978:88). Although religious ideas were developing at a rapid pace in the Hawaiian Islands after European contact, another major change was simultaneously taking place surrounding the relationship of Native Hawaiians to the land they inhabited for generations immemorial, The Māhele.

#### 2.4.2 The Māhele and Kuleana Act

The most significant change in land-use in the Hawaiian Archipelago came with The Māhele of 1848 which brought about the privatization of land in Hawai'i. The word *māhele* meaning literally “to divide, cut, partition” (Pukui and Elbert 1986:219), hastened the shift of the Hawaiian economy from that of a subsistence based economy to that of a market based economy. During The Māhele, all of the lands in the kingdom of Hawai'i were divided between *mo'i* (king), *ali'i* (chief/ruler), *konohiki* (land manager), and *maka'āinana* (tenants of the land) marking passage into the Western land tenure model of private ownership. On 8 March 1848, Kamehameha III (Kamehameha III) further divided his personal (*mo'i*) holdings into lands he would retain as private holdings and parcels he would give to the newly budding Hawaiian Government in trust. This act paved the way for government land sales to foreigners as a source of funding for government operations, and in 1850, the legislature granted resident aliens the right to acquire fee simple land rights (Moffat and Fitzpatrick 1995:41-51).

Native Hawaiians who desired to claim the land on which their families had historically worked and resided were required to present testimony before the Board of Commissioners to Quiet Land Titles. Upon acceptance of a claim the Board granted a LCA to the successful applicant. The awardee was then required to pay, in cash, an amount equal to one-third of the total market value of the awarded parcel as a commutation fee. If this payment could not be made in cash, an acceptable substitute was to cede the one-third of the awarded parcel to the government as payment for the commutation fee (Chinen 1958:13).

By 1850 portions of *mo'i*, *ali'i*, *konohiki* and government LCAs were being sold to help pay commutation fees owed by their awardees and for simple cash profits from selling so-called unused land. As these lands belonging to Hawaiian elites had historically been cultivated by the *maka'āinana* in pre-Contact times, when the lands were being sold many tenant farmers were being inadvertently dispossessed of their homes and arable plots that lied within the sold portions of land. In acknowledgment of this dispossession, the Board passed resolutions authored by the Privy Council through the legislature in 1850 that aided in the protection of the rights of tenant farmers whose homes and plots were essentially owned by overarching LCA awardees (who may have owned the entire *ahupua'a* or *'ili* in which the plots were located). The plots awarded to



tenant farmers in this fashion were termed *kuleana* lands, or simply *kuleana* (*kuleana* meaning “right, privilege, responsibility”) (Chinen 1958:29-31; Pukui and Elbert 1986:179). Under this type of land acquisition, claimants were required to produce accurate surveys of the claimed plots, and to have these claims scrutinized by the Board to ensure that claimants were not attempting to acquire wastelands or additional arable lands with “the seeming intention of enlarging their lots” (Chinen 1958:30). Upon completion of this process, Chinen (1958:30) states that:

The native tenants were awarded their *kuleanas* free of commutation. The owner of the *ahupua'a* or *'ili kupono*, out of which the individual *kuleanas* were taken, was deemed responsible for the settlement of the whole government commutation... Though other lands escheated to the government upon the death of an owner without an heir, the *kuleanas* escheated to the owner of the *ahupua'a* or *'ili kupono* within which it was located. (Chinen 1958:30)

This change in escheating was because the overarching LCA owner was deemed to have “reversionary interest” in the parcels due to having been responsible for its commutation fee to the government (Chinen 1958:30). This reclamation of *kuleana* land would later come to have repercussions across large tracts of land as Western disease continued to run rampant in Hawaiian populations, and as people drifted toward more populous city centers, leaving many *kuleanas* abandoned and heirless. Patrick Kirch drives at the inevitable conclusion of the escheating of these lands in a time of Western economic expansion by stating that “By the 1870s, vast tracts of lands had been acquired by an expanding class of white sugar planters. Mostly of American origin...” (Kirch 2012:287). Similar acquisitions in the name of commerce were also being carried out in leeward ranching lands where abandoned and heirless *kuleanas* also existed.

*Kuleana* claims could be made for nearly any resource procuring activity from agricultural plots, to fishing grounds, to rights to harvest naturally existing vegetation, to naturally existing and artificially channeled water sources. Within the Māhele records for the four license areas (Table 4 through Table 7) there are claims for terrestrial agricultural features such as *lo'i* (irrigated *kalo* terraces), *pākanu* (garden, planting enclosure), *'auwai* (artificial irrigation canals, used to feed *lo'i*), *kula* (fields, open pasture), *pali* (cliff, precipice, or steep hill suitable for cultivation of select plants), *kīhāpai* (small cultivated patch or orchard), *mo'o* (ridge for similar purpose as *pali*), and *pō'alima* (small agricultural patches tended in traditional times solely for chiefly tribute) (Pukui and Elbert 1986:147,178,305,312,334). There are also *kuleanas* claimed for their naturally occurring vegetation and the right of tenants to collect these resources, such as *'ie* (aerial roots of the *'ie'ie* vine, used in plaiting, basketry, and wicker weaving), *olonā* (shrub with fibrous bark used in fishnets, baskets, and to construct *tī* leaf raincoats and capes), *wauke* (paper mulberry used in making *tapa* cloth), *hala* (pandanus tree) and wildy occurring *kalo* (taro) and sweet potato (Pukui and Elbert 1986:50,94,256,286). Lastly are the *kuleana* claims over aquatic resources such as off-shore fisheries (documented as “sea” in LCA awards) and *muliwai* (river mouth, freshwater pool behind a shoreline sand bar) that are naturally occurring and not man made (Pukui and Elbert 1986:256).

*Kuleana* claims were slightly more complicated in that many of these claims were made to lands within several *ahupua'a* or *'ili kupono* that lie in neighboring land divisions. These claims were documented, in their entirety, within the individual Māhele books for different land divisions. This means that often multiple separate claims to any one person will be duplicated within the record

books of different land sections, though the parcels comprising the entirety of the claim are distributed among several larger land divisions distant to each other. Resulting from this process the entire contents of *kuleana* claims will be fully enumerated in its respective table, though only a portion of an individual's *kuleana* claim may be present in the accompanying map for the specific license area. LCAs documented within the four license areas are displayed below in Figure 18 through Figure 21 and listed in Table 4 through Table 7.

### 2.4.3 Mid- to Late 1800s

The foundation for private land ownership set by the Māhele of 1848 began a very marked pace of development across the entire archipelago, and Maui was no exception to the age of Western development that was about to dawn across the island. The Māhele enabled many foreigners and foreign nationals to acquire land for the establishment of ranching and plantation operations, including the infrastructure projects that were aimed at supporting these land-intensive industries (aqueducts, roads, etc.). All of this was happening alongside civic development in the more populated areas as the Hawaiian economy grew, a growth funded in part by the government land sales to foreigners. Additionally, many foreign nationals who relocated to Maui to work were enabled to acquire their own homestead lands, and thus establish themselves and future generations on the island, increasing the ethnic and cultural diversity of Maui. Though these changes would signify a new period of economic growth for the Kingdom of Hawai'i as a whole, the pace of development would continue to impact the social and environmental landscape of East Maui.

#### 2.4.3.1 Disease in East Maui

One of the earliest impacts of European contact on Native Hawaiians was the spread of Old-World diseases into island populations. With the arrival of Captain Cook in the late 1770s came the initial introduction of venereal disease and possibly respiratory ailments (Kirch 2012:158). Kirch also suggests that venereal disease is often overlooked in disease impact studies since it does not usually kill its victim “although its effects on a population with no prior exposure may have been more severe than usual” (Kirch 2012:158). Resulting from the introduction of venereal disease, the birthrate very likely plummeted because of the severe effects of disease on women's reproductive organs who have never been exposed to them. The number of rampant diseases was to increase steadily alongside the number of traders, merchants, and visitors arriving from distant shores. To this effect Kirch (2012:158) observes:

Later ships brought even more virulent diseases: dysentery, measles, tuberculosis, smallpox, and leprosy. Before Cook the islands were free of all these old-world scourges; consequently, Hawaiian bodies did not have antibodies or resistance against them. As we now know, such ‘virgin soil’ epidemics can have devastating effects on indigenous populations. (Kirch 2012:158)

Although there is serious debate about the actual count of the Hawaiian population at first contact with Europeans, making an exact figure for the depopulation of Hawaiians by disease difficult to grasp, the known effects of the introduction of foreign disease make a population reduction from 500,000 in 1779 to 130,000 fifty years later seem feasible (Kirch 2012:158). Given the histories of European contact in other previously unexposed locations it is likely that morbidity can account for much of the decline. Though early mortality rates are sporadic at best and often

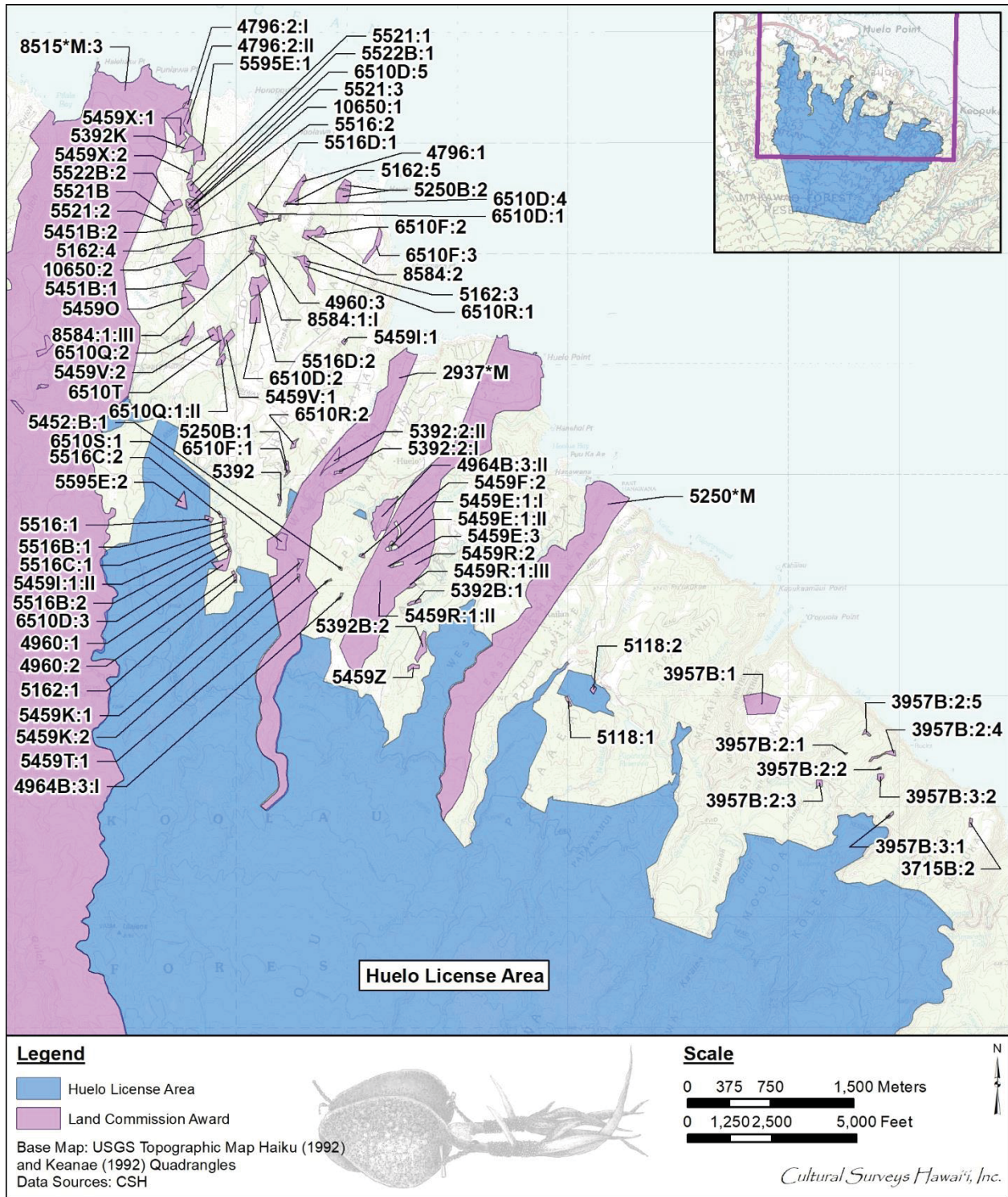


Figure 18. LCAs near the Huelo License Area (U.S. Geological Survey 1992a, c)



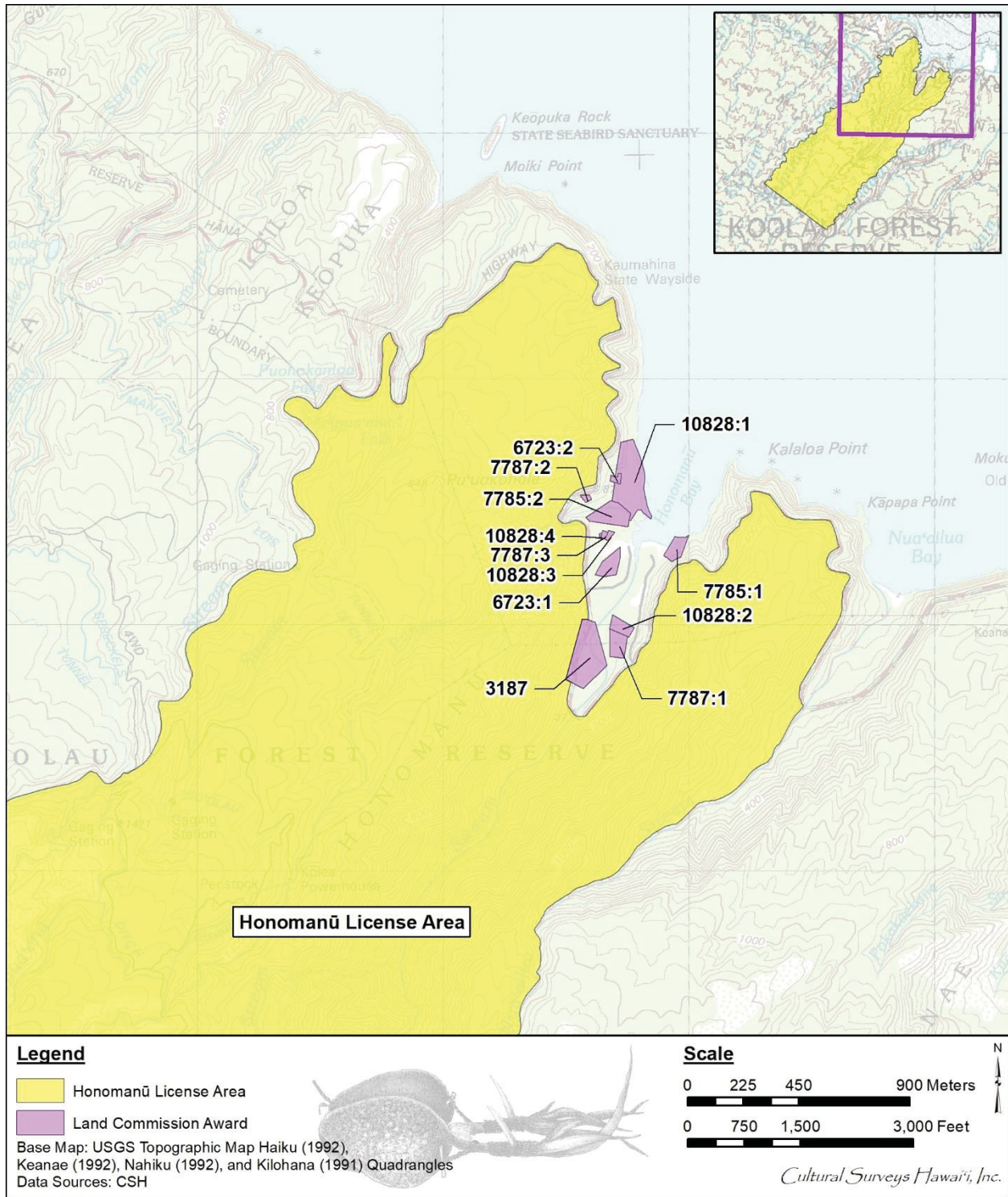


Figure 19. LCAs near the Honomanū License Area (U.S. Geological Survey 1991, 1992a, c, d)



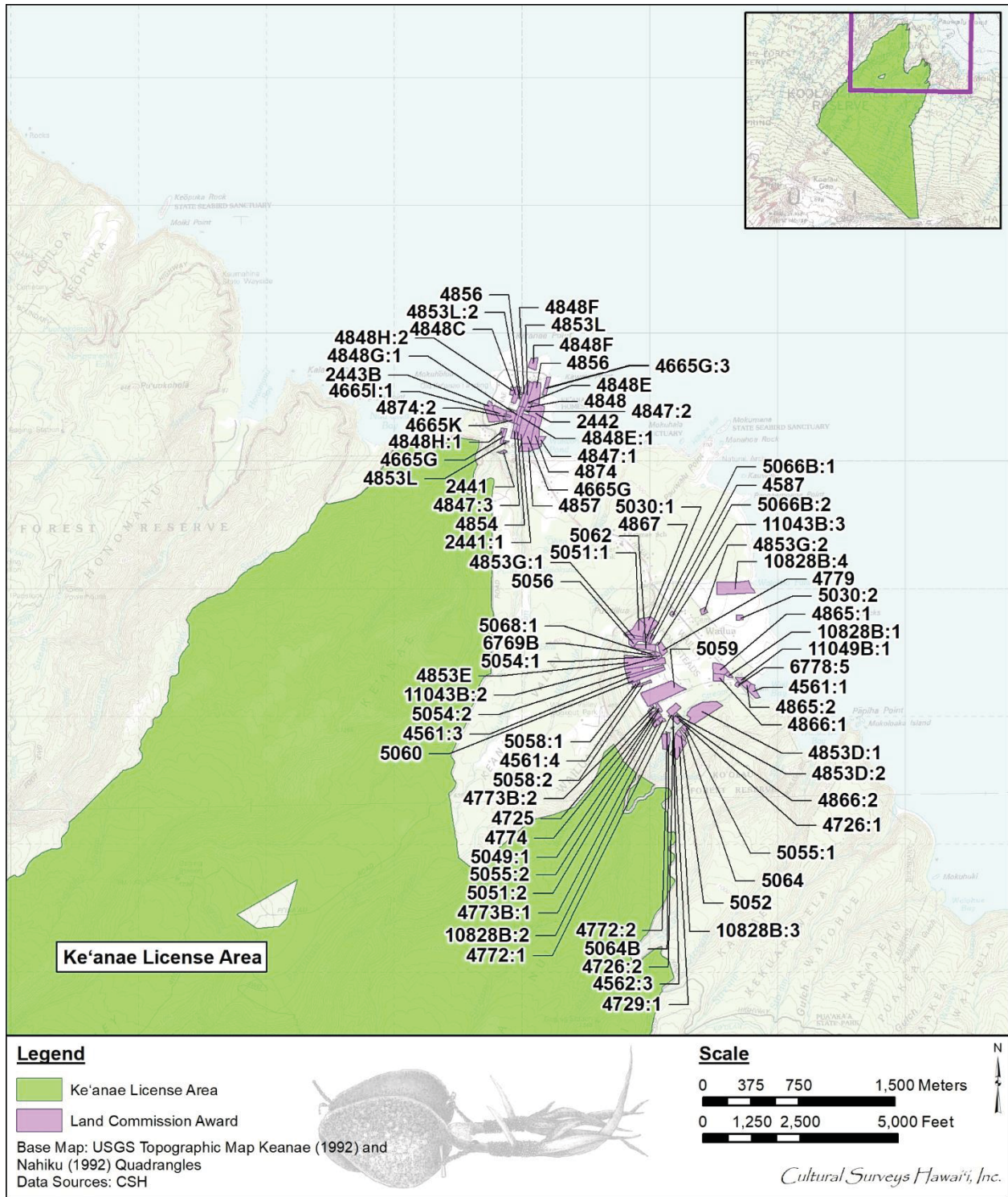


Figure 20. LCAs near the Ke'anae License Area (U.S. Geological Survey 1992c, d)



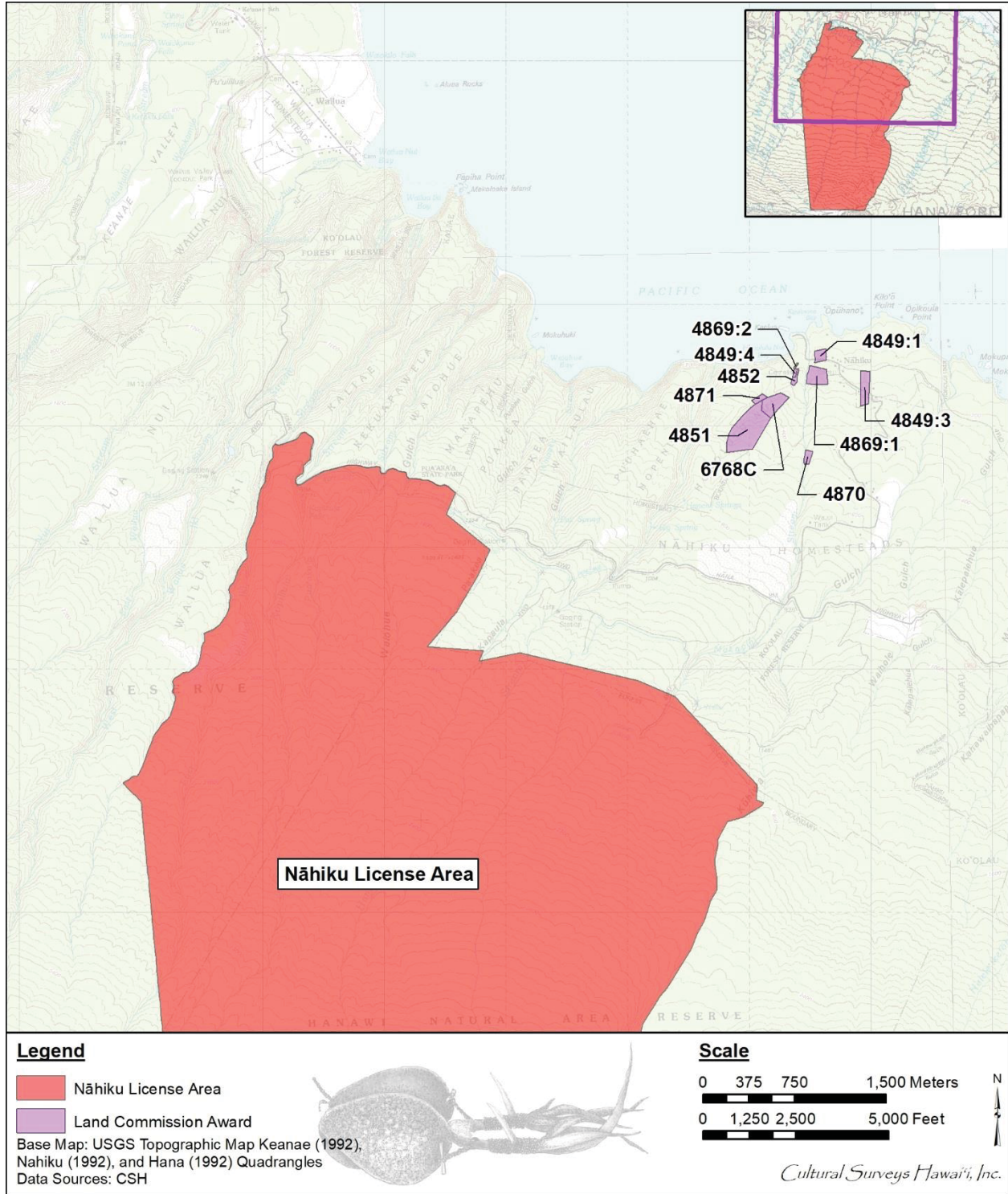


Figure 21. LCAs near the Nāhiku License Area (U.S. Geological Survey 1992b, c, d)

Table 4. LCAs near Huelo License Area (Waihona 'Aina 2000)

LCA #	Claimant	'Ili	Land Use
2937M	Harbottle, William	N/A	Possible residence and the sea
3715B	Kekuahani	Keopuka, Loiloa	Two <i>lo 'i</i> , <i>kula</i> , sea shore, <i>pali</i> , an <i>olonā</i> pasture, and government road
3957B	Keuoho, Luka	Punaluu	Two <i>kīhāpai/pākanu</i> , <i>pali</i> , and a stream
4796	Kealoha	Waikakulu, Paniawa, Punahele	Three <i>lo 'i</i> , two <i>kula</i> , three <i>kīhāpai</i> , sea shore, and two <i>pali</i>
4960	Kapahu	Halepohaku, Kahauiki, Kahikiloa	Four <i>lo 'i</i> , two <i>kula</i> , <i>pali</i> and a stream
4964B	Kaiewe Kamakau II	Kapalaoa, Kauulu, Wailaahili, Waialaea	One house lot, a government road, a road, <i>pali</i> , and the sea
5118	Kaualeleiki	Papaaea, Ha'ikū, Hanawana	Five <i>lo 'i</i> , a house lot, two <i>kula</i> , <i>pali</i> , government road, two streams, and <i>wauke</i>
5162	Kamohai	Haniapuaa, Halelua, Kahakona, Waikakulu	Five <i>lo 'i</i> , a <i>kula</i> , a <i>pali</i> , and sea shore
5250B	Uheke	Keaweula, Paomai	One <i>lo 'i</i> , a <i>kula</i> , a <i>pali</i> , and sea shore
5250*M	Kanui	Kawahae, Keahou	Two <i>lo 'i</i> , a <i>kula</i> , a <i>pali</i> , three <i>pō 'alima</i> , and a stream
5392	Huluhulu	Puolua, Hanehoi, Waipio	Two <i>pali</i> , a stream, and sea shore
5392B	Kawahine	Popopanui, Nuukele	Three <i>lo 'i</i> , three <i>pō 'alima</i> , two <i>pali</i> , and a <i>kula</i>
5392K	Makahikipuni	Kapapaanae	One <i>lo 'i</i> , a <i>pō 'alima</i> , a stream, and a <i>pali</i>
5451B	Palea	Kahauiki, Ulukaa	25 <i>lo 'i</i> , four potato <i>mo 'o</i> , 'ie, three <i>pō 'alima</i> , a stream, a <i>pali</i> , and a road to the sea
5452	Pia	Mauluku	19 <i>lo 'i</i> , five potato <i>mo 'o</i> , a house lot, and <i>wauke</i>
5459E	Kuluwaimakalani	Makaue, Hanehoi	Two <i>lo 'i</i> , two <i>kula</i> , a <i>pō 'alima</i> , and a <i>pali</i>
5459F	kaahaiea	Palau, Ohia	Three <i>lo 'i</i> , two <i>kula</i> , a <i>pō 'alima</i> , <i>pali</i> , and <i>olonā</i>
5459K	Kamauu	Waipio, Holawa, Mokupapa	Two <i>lo 'i</i> and <i>pali</i>

LCA #	Claimant	'Ili	Land Use
5459I	Pohina	Ohia, Opae	Three <i>lo 'i</i> , a <i>kula</i> , <i>pali</i> , a stream, sea shore, and a government road
5459O	Hewahewa	Papuaa, Pohaku	One <i>lo 'i</i> , a <i>pali</i> , a stream, and a road
5459R	Pahia	Kahuku, Pulehu	Two <i>lo 'i</i> and one <i>pō 'alima</i>
5459T	Lalahili	Ohia, Kawahapulua	One <i>lo 'i</i> , a <i>kula</i> , a house lot, and a <i>pō 'alima</i>
5459V	Kaliki	Kuamoohua	One <i>lo 'i</i> , a <i>kula</i> , and two <i>pō 'alima</i>
5459X	Imihia	Kaalukanu, Papamuku, Puniawa	Four <i>lo 'i</i> , a <i>kula</i> , potatoes, three <i>pō 'alima</i> , a stream, the sea, and a <i>pali</i>
5459Z	Kaleo	Mohala	One <i>lo 'i</i> , a <i>kula</i> , and a <i>pō 'alima</i>
5516	Hillawe	Kaloiki, Kamania	Two <i>lo 'i</i> , a <i>kula</i> , two <i>pō 'alima</i> , a stream, and a <i>pali</i>
5516B	Mua	Kuahanahana	Two <i>lo 'i</i> , a <i>kula</i> , and a <i>pali</i>
5516C	Kaio	Halenoni	One <i>lo 'i</i> , a <i>pali</i> , and a stream
5516D	Naoopu	Kuahanahana	Two <i>lo 'i</i> , two <i>kula</i> , a stream, and a <i>pali</i>
5521	Nakaikuaana	Halaula, Kamania, Kapahi	Four <i>lo 'i</i> , four <i>kula</i> , a stream, a <i>pali</i> , and shattered <i>koa</i>
5521B	Kanewaa	Halaula	One <i>lo 'i</i> and a <i>kula</i>
5522B	Kaopu	Halaula, Papamuku	One <i>lo 'i</i> , a <i>kula</i> , a <i>pō 'alima</i> , a <i>pali</i> , and a stream
5595E	Kepaa	Hunananiho	27 <i>lo 'i</i> , a stream, fresh water shrimp, two <i>pō 'alima</i> , and seven <i>koa</i> trees
6510D	Manoa	Kauhamano, Waikakulu, Halumaumau, Kahikiloa, Kamania	Five <i>lo 'i</i> , a house lot, three <i>pō 'alima</i> , and two <i>pali</i>
6510F	Hanauwaha	Puuokaupu, Maoli, Kauhiulu, Pukuhale, Waikakulu	Five <i>lo 'i</i> , four <i>kula</i> , a <i>pō 'alima</i> , and two <i>pali</i>
6510Q	Kawaha	Kalanikahuli, Waihiwa, Kalualaea	Three <i>lo 'i</i> , <i>kula</i> , and <i>pali</i>
6510R	Naone	Kauhiulu, Lapo	Two <i>lo 'i</i> , a <i>kula</i> , a <i>pali</i> , and a stream



LCA #	Claimant	'Ili	Land Use
6510S	Makue	Lui, Panau, Haliimaumau, Waikakulu	Four <i>lo 'i</i> , a <i>kula</i> , a <i>pō'alima</i> , a stream, and a <i>pali</i>
6510T	Kuewa	Waiohiwa	One <i>lo 'i</i> , a <i>kula</i> , a <i>pali</i> , and a stream
8515*M	Keoni Ana/John Young, Jr	Owa, Puako, Haleu, Halehaku, Holili	No details for Halehaku LCA
8584	Keoho	Kahaniki, Kahakona, Waikakuhe, Kaiui, Kaluaalaea, Ukulei	14 <i>lo 'i</i> , <i>kula</i> , sweet potatoes, 'ulu, two 'ōhi'a trees, <i>moku mau 'u</i> , two <i>pali</i> , three streams, and shattered <i>koa</i>
10650	Pia	Kamania, Uohale, Ulukee, Puniana, Kawaipaa	Five <i>lo 'i</i> , a <i>kula</i> , sweet potatoes, two <i>pali</i> , <i>wauke</i> , a gobey fish stream, forest, and a road to the mountains.

Table 5. LCAs near the Honomanū License Area (Waihona 'Aina 2000)

LCA #	Claimant	'Ili	Land Use
3187	Kekio, Z.	Kekia, Keehue	<i>Kalo</i> patch, stream, and <i>pali</i>
6723	Malaula	Palawai, Niulii	One <i>kīhāpai</i> , <i>lo 'i</i> , and a stream
7785	Kinolau	Halelaau	A <i>pali</i> and a stream
7787	Wahine	Kanaha	Six <i>lo 'i</i> , <i>pali</i> , and stream
10828	Palaitle	Niulii, Okuhekuhe, Halelaau	Nine <i>lo 'i</i> , <i>pali</i> , 'auwai, and a fish pond

Table 6. LCAs near the Ke'anae License Area (Waihona 'Aina 2000)

LCA #	Claimant	'Ili	Land Use
2441	Kealina, Tito	Lalaola, Kuoo, Pahoa	19 <i>lo 'i</i> , a <i>kula</i> , forest, <i>olonā</i> , two house lots, 'auwai, and stream
2442	Kaea	Analao, Kiapu	Six <i>lo 'i</i> , a <i>kula</i> , forest, <i>hala</i> grove, and a stream

LCA #	Claimant	'Ili	Land Use
2443B	Kanehaku, I	Kanemakue	Two <i>lo 'i</i> , a pond, a <i>kula</i> , forest, <i>olonā</i> , the sea, a stream, and a <i>pali</i>
4561	Wahinemaikai	N/A	Two <i>lo 'i</i> , <i>pali</i> , government road, ' <i>auwai</i> , and stream
4562	Wailaahia	Kaakee, Maulu, Palolena, Paula	13 <i>lo 'i</i> , <i>pali</i> , stream, and a house lot
4587	Hoonoho	N/A	12 <i>lo 'i</i> , one <i>kula</i> , and a house lot
4665G	Ehu	Kalihi, Pahoa, Kukuiohoko	17 <i>lo 'i</i> , a house lot, <i>pali</i> , stream, the sea, and <i>olonā</i>
4665K	Kanuku	Panaewa, Kuoo, Makaiwa	One house lot, the sea, <i>olonā</i> , stream, and <i>pali</i>
4665I	Kauakahi/Kanakahi	N/A	Three <i>lo 'i</i> , a <i>pali</i> , stream, and <i>olonā</i>
4725	Moo	Paakamaka	Nine <i>lo 'i</i> and a <i>kula</i>
4726	Makaole	Paulae, Kaonohikaa, Pohonui, Pohoiki	23 <i>lo 'i</i> , two <i>kula</i> , streams, the sea, <i>olonā</i> , a path/road
4729	Moo II	Makuku, Paulae, Palolena, Maulu	Eight <i>lo 'i</i> , a house lot, and stream
4772	Naiwi	Makaku, Waieli, Waikani, Maulu, Keononalu, Kalimapuhi, Kaahu	Nine <i>lo 'i</i> , a path/road, a stream, and a <i>pali</i>
4773B	Nakihei	Kalimapuhi, Paakamaka	Ten <i>lo 'i</i> , an ' <i>auwai</i> , a stream, and a <i>pali</i>
4774	Nalimanui	Kealia	Residence and a <i>pali</i>
4779	Naiapea	Keononalu	18 <i>lo 'i</i> , <i>kula</i> , and <i>kīhāpai</i>
4847	Malaelua	Kuoo, Paehala	11 <i>lo 'i</i> , a house lot, <i>pali</i> , the sea, a foot path, and ' <i>auwai</i>
4848	Kuluhiwa	Ololokeahi, Pīlanolipi, Ohia	Nine <i>lo 'i</i> , a <i>kula</i> , stream, and <i>pali</i>
4848C	Keliiaea	Kuoliolio	One house lot, a <i>kula</i> , and a <i>pali</i>
4848E	Maewaewa 2	Lalaola, Ololokeahi	One <i>lo 'i</i> and a house lot
4848F	Maewaewa 1	Kekaele & Kukuiohono, Kehaele	The sea

LCA #	Claimant	'Ili	Land Use
4848G	Mu	Pohakuokane, Lalaola, Waiapuka, Haleakea, Lonowai, Kaaunaku	Three <i>lo 'i</i> , a house lot, <i>olonā</i> , stream, <i>pali</i> , and <i>kīhāpai</i>
4848H	Kailio	Kealokekua, Makaiwa, Kanemakue	Five <i>lo 'i</i> , a house lot, and <i>pali</i>
4853D	Naha	Palolena, Paulae	Two <i>lo 'i</i> , a house lot, <i>olona</i> , a foot path, and a stream
4853E	Kahahāhei	Waiehi, Paakamaka	One <i>lo 'i</i> , a house lot, <i>olona</i> , stream, and ' <i>auwai</i>
4853G	Kuheleaumoku	Keononalu, Kapae, Kaku, Kalaalea	One <i>lo 'i</i> , a house lot, two <i>olonā</i> , stream, <i>pali</i> , a foot path, a road, and a pig pen
4853L	Kaopa	Koleaamoku, Waioea, Makaiwa	One <i>lo 'i</i> , a house lot, and an ' <i>auwai</i>
4854	Mamaikawaha	N/A	Six <i>lo 'i</i> , a <i>kīhāpai</i> , and a stream
4856	Kaihu	Haleakea, Waiolea	Six <i>lo 'i</i> , a <i>kula</i> , and <i>olonā</i>
4857	Naohiki	N/A	Ten <i>lo 'i</i> , two <i>kula</i> , sweet potatoes, a <i>muliwai</i> , <i>olonā</i> , and <i>pali</i>
4865	Kapali	Kealia, Paulae	One <i>lo 'i</i> , a house lot, road, and a <i>pali</i> (bordered by a prison and a chapel)
4866	Kaholowaa	Waiehi, Keonoulu, Paulae, Paakamaka	Seven <i>lo 'i</i> , a house lot, and a path/road
4867	Wahapuu	Keononalu	One house lot and a <i>pali</i>
4874	Makea	Paehala, Kipapa	Two <i>lo 'i</i> , a <i>pali</i> , and a pig pen
5030	Kekahuna	Keononalu, Paehala, Paulae, Palolena	Ten <i>lo 'i</i> , <i>kula</i> , a foot path, a house lot, a pig pen, ' <i>auwai</i> , and a stream
5049	Kauoa	Paakamaka	One house lot, two roads, ' <i>auwai</i> , a <i>pali</i> , and a stream
5051	Kamanu	Paakamaka, Keononalu	34 <i>lo 'i</i> , a <i>kula</i> , a house lot, <i>pali</i> , and ' <i>auwai</i>
5052	Kuiki	Palolena	29 <i>lo 'i</i> , a <i>kula</i> , a house site, a <i>pali</i> , and a stream
5054	Kaiwikaola	Waiehi	One house lot, a <i>pali</i> , and a foot path

LCA #	Claimant	'Ili	Land Use
5055	Kamai	Paakamaka, Pololena	27 <i>lo'i</i> , a house lot, stream, an <i>'auwai</i> , a <i>pali</i> , and a foot path
5056	Kumulani	Keononalu	21 <i>lo'i</i> and a <i>kula</i>
5058	Kauila	Waieli	22 <i>lo'i</i> , a path/road, and an <i>'auwai</i>
5059	Kukui	Pukalawa	A <i>pali</i> and beach
5060	Kalawaia	Waieli	Ten <i>lo'i</i> , a house lot, a path/road, and a <i>kula</i>
5062	Kahakauiila	Keononalu	20 <i>lo'i</i> , a <i>kula</i> , a foot path, <i>pali</i> , beach, and an <i>olonā kīhāpai</i>
5064	Keahi	Palolena, Waieli	Five <i>lo'i</i> , a stream, <i>'auwai</i> , the sea, and a path/road
5064B	Kaluahinenui	Waikani	Three <i>lo'i</i> , a <i>pali</i> , a stream, and <i>'auwai</i>
5066B	Kaohilae	Keononalu	No details
5068	Kauiki	Keononalu, Waieli	24 <i>lo'i</i> , a <i>kula</i> , a road, and <i>pali</i>
6769B	Ohule	Waieli	Six <i>lo'i</i> , a <i>pali</i> , the sea, and a stream
6778	Kapahukaa	Pukalawa, Waikani, Piiaola, Kapaiki	One house lot and a stream
10828B	Kaniho	Palolena, Kalimapuhi, Kealaalaea, Waiuaiki, Piikalawa	<i>Kalo</i> patch, streams, <i>pali</i> , a foot path, a fish pond, <i>'auwai</i> , a government road, and the sea
11043B	Kaumauma	Keononalu, Piikalawa	Two <i>lo'i</i> , a house lot, a pig pen, road, a foot path, and <i>'auwai</i> ,
11049B	Naiilima	Kupalu	N/A

Table 7. LCAs near the Nāhiku License Area

LCA #	Claimant	'Ili	Land Use
4561	Wahinemaikai	N/A	Two <i>lo'i</i> , <i>pali</i> , government road, <i>'auwai</i> , and stream



LCA #	Claimant	'Ili	Land Use
4849	Kalohelau, wahine	Kahoomanamana, Koakumanamoana	Three <i>lo'i</i> , one <i>kula</i> , a house lot, road, a foot path, a pig pen, a stream and <i>pali</i>
4851	Aoao	Kahooana	A stream
4852	Uwaua	Kawiwi	Possible residence and a stream
4869	Kaumoki/Kaomoai ki	Kaohe, Kaohipoka	One house lot and a <i>pali</i>
4870	Kealiiokekanaka	Waawaa, Haawaa, Waikupo	Four <i>lo'i</i> , a pig pen, stream, <i>'auwai</i> , <i>olonā</i> , forest, and <i>pali</i>
4871	Kalahie	Olopana	Stream, forest, and the sea
6768C	Naholo	Ihuhinui	A house lot, <i>lo'i</i> , road, stream, <i>pali</i> , and beach

inaccurate in their measurements, there is some evidence of the impact of disease in Hawai'i in this early period.

Lack of demographics regarding salient mortality rates is best explained by logistical issues present in the developing nation of Hawai'i in the early to mid-1800s. In *Historical Statistics of Hawaii*, Robert Schmitt (1977:40) explains that “statistics on deaths by cause of death are particularly lacking in long term comparability, not only because of serious underregistration in the early years but also because of major changes instituted from time to time in classification procedures.” The first statewide collection of mortality statistics associated to a cause of death did not occur until the early 1900s, and then the statistics were only in terms of individuals affected and were not tabulated according to either ethnic heritage or nationality. Regardless of this glossing of demography, the early records show tuberculosis being particularly ravaging in the beginning of the twentieth century. The first half of the 1900s regularly shows over 1,000 active cases of tuberculosis with as many as 531 deaths annually (Schmitt 1977:80). Record keeping for infectious disease (barring those transmitted by intercourse) gained more coherence by the mid-1900s, demonstrating the most commonly reported disease afflictions across the archipelago were leprosy, tuberculosis, gonorrhea, syphilis, chicken pox, influenza, measles, mumps, pertussis, shigella, and typhoid (Schmitt 1977:80-82).

From the early census data it becomes evident that one of the most alarming among the contagions was influenza, which in some years had death tolls well above 1,000 souls, with some years having as many as 6,677 (Schmitt 1977:82). Such observations were frequently reported in the local newspapers, such as with an article by J.S. Green (1857:1) in *The Pacific Commercial Advertiser*, where the author reported that “we have all been afflicted with the influenza, natives and foreign residents. Not a few of the aged and feeble among the people have died.” Sporadic reports begin to appear with regular frequency in newspaper editorials after this, such as a 10 February article in the *Daily Honolulu Press* (1883:1):

In the month of July of this year we had a visitation of Influenza...Very many among the foreign population were attacked, and it prevailed extensively among the natives, death not infrequently resulting with the latter, from disposing causes. Among these was John Young (Keoni Ana) the Minister of the Interior, aged only 47. (*Daily Honolulu Press* 1883:1)

Even with the high instance of mortality among Hawaiians, it should be noted that the person responsible for the census of the Kingdom in the mid-1800s, Richard Armstrong, thought the reported numbers were far too low. He believed that for every reported death two to three went unreported (Daws 1968:140). Flu was not the only concern in the Hawaiian Islands as made apparent by a newspaper advertisement in the 4 October 1892 *Evening Bulletin* announcing the closure of all Hawaiian Ports with the sole exception of Honolulu, due to Cholera outbreaks (Macfarlane 1892:2) (Figure 22). Despite the remoteness and relative isolation of East Maui there was still sporadic reporting of disease afflictions affecting the population there.

Smallpox made an appearance in the early newspaper reports regarding disease among residents of East Maui. There is a November 1853 account of the first case of small pox in Hāmākua Loa from a passenger aboard the schooner *Sally* (*The Polynesian* 1853a:2).

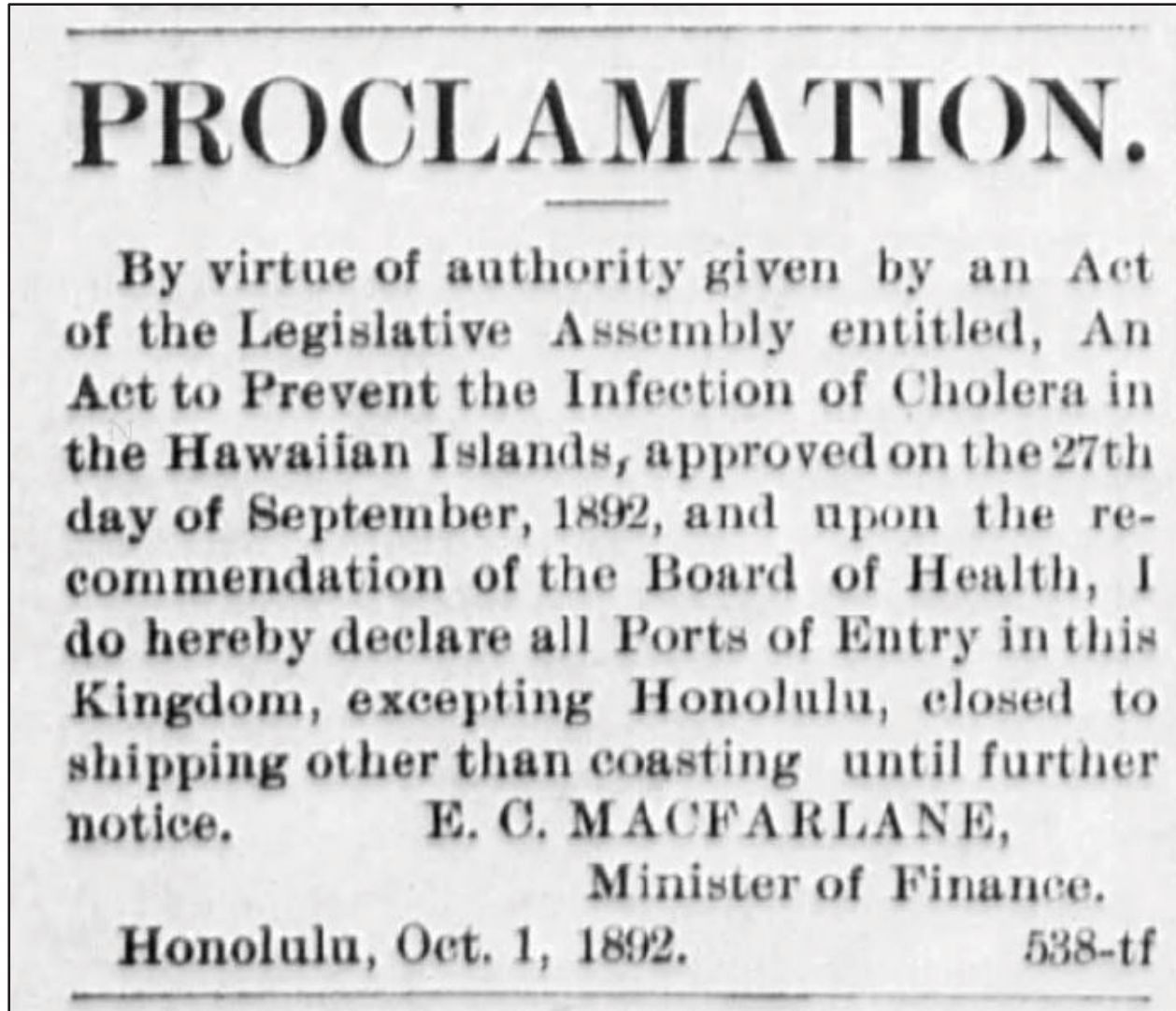


Figure 22. Announcement of port closure published in a Honolulu paper resulting from a cholera outbreak (Macfarlane 1892:2)

In a 24 December 1853 update of the account, the Commissioners of Public Health provide a description of how the disease arrived in the region as follows:

The woman, as near as we could learn from herself and her husband, left the schooner on Friday evening, and staid over night not far from Kahului. The next day she made her way home: traveling, as we suppose through Hamakuapoko, Maliko and Kalanakahua, and reached her mother's house, at Haiku, on Saturday night. This was one of five or six houses built as close together as they could stand; and we think from 12 to 20 persons occupied these houses. Sabbath morning some 30 individuals passed within a few rods of the house, on their way to meeting. One of us rode to the house and saw the woman. At 2 o'clock, P.M., he returned to the house, with the magistrate of the district, and found the woman's face covered with the small pox. She was ordered to be removed to the infected district, and the house was immediately destroyed, and the village deserted. No other case of the small pox have we had in Hamakualoa. (The Polynesian 1853b:2)

The following month, another update on small pox in East Maui is provided in the 21 January 1854 edition of Polynesian as follows:

A correspondent on East Maui writes,—"I am happy to report the state of things on this part of the island, as prosperous. There have been from six to ten cases of small pox in Hamakua, and three deaths. No new case during the past six weeks. We can now report freedom from the small pox, if no new case should be introduced from abroad. There has been no case in Koolau, none in Kula, none in Honuaula, and but one or two in Wailuku. We hear that there are but few cases remaining in the districts of Hana, Kipahulu and Kaupo." (The Polynesian 1854)

These accounts may have been related to a Honolulu epidemic of smallpox in 1853 and 1854 (Daws 1968:139) and of its impacts to the neighbor islands. It was a large pan-Hawaiian problem of which the population was wholly unprepared. Daws (1968:140) relates the scene of devastation in the more populated cities:

The Hawaiians had never given much attention to Western ideas about medical treatment, and in this instance they paid a terrible price...Hawaiians fell sick everywhere. Some were abandoned and died alone; their bodies were left to rot. Others were buried where they lay, without coffins, in graves so shallow that wandering pigs and dogs could unearth them. Some native families nursed their sick at home, devotedly and uselessly, and carefully laid the dead under the dirt floors of their thatch huts or in their house yards, following their old burial practices and condemning themselves to follow the dead into the grave. (Daws 1968:140)

Although large epidemics were rare in the eastern districts of Maui, when they did arrive, they often had devastating effects. On 2 October 1869, a brief call to action was published in *The Pacific Commercial Advertiser* describing a deadly epidemic that was occurring in Honomanū and throughout the Island of Maui as follows:

By a letter received yesterday from East Maui, we learn of the continued ravages of the epidemic fever which has prevailed for months on that Island. Rev S. Kamakahiki states, under date of the 23d, that since the 1<sup>st</sup> of September there have



been fifteen deaths at Honomanu and seven at Keanae, and that a large number of the natives were sick. From another source we learn that the once numerous population of Honomanu valley has dwindled down to two or three families. In behalf of these dying natives, we ask the Board of Health if all has been done that can be done to save them and stay the ravages of the fever? If not, is not the Board censurable? (The Pacific Commercial Advertiser 1869b:3)

The ailment to blame for the 1869 outbreak was never explicitly named, but given the poor state of disease reporting in general in more populous areas (Figure 23), it is unsurprising that only small attention was paid to this affliction from Honolulu newspapers. The testament of the reporter clearly shows that even something as common as fever could have terrible repercussions on isolated and non-immune communities. The precise impact of various diseases on the populations of East Maui is wanting in terms of public recordation, but it does call to mind the many reports of early island wide archaeological studies (Stokes 1916; Thrum 1909b; Walker 1931) that report evidences of extensive habitation and agricultural features lying abandoned throughout East Maui.

#### 2.4.3.2 Linton L. Torbert in Honua'ula

As early as the mid-1800s there was a small farming settlement located at Honua'ula, complete with a small landing for passing merchant ships traversing the southeast corner of Maui on their way to Kahului, Honolulu, and beyond. A prominent figure associated with Honua'ula at this time was Linton L. Torbert, an established rancher and agriculturalist operating a sizable tract of land in the Kula uplands and a small plantation at Honua'ula (Ulupalakua Ranch 2017). Torbert was a native of Newton Pennsylvania and his entry into the Territory of Hawai'i went quietly unnoticed.

In *Chapter of Firstling's*, Thrum (1909a) reports that, ca. 1820, a large red variety of Irish potato was introduced to Hawai'i by Captain Jos. Vaughn. Some of these potatoes were sent to Governor Hoapili on Maui where they flourished better than on other islands (Thrum 1909a:129). Torbert was a prominent figure in the potato trade that had developed between California and Hawai'i between 1845 and 1856 while he oversaw the growing of corn and potatoes on his *kula* lands on the western slope of Haleakalā. Torbert's foodstuffs were then shipped to California by way of island merchant ships to fuel the population boom associated with the California gold rush. Tolbert was also one of the first individuals to plant sugar cane on Maui under the direction of King Kamehameha III (Ulupalakua Ranch 2017), in addition to being appointed as a committee member of the Royal Hawaiian Agricultural Society (The Polynesian 1850).

In February 1846 Torbert was charged, along with one of his employees named Benjamin Furbush, in the killing of a man named Aki in the Honua'ula region. Although both men were found guilty of the crime, their sentences were commuted upon payment of \$200 each for extenuating circumstance (Cushing 1985). Robert L Cushing in his account of the proceedings found within *The Beginnings of Sugar Production in Hawaii* (Cushing 1985:22) stated that:

The circumstances of the shooting, described in the newspaper account of the trial, suggest that there was some provocation, that it was also to some extent accidental, and that Torbert and Furbush provided as much assistance as they could to Aki, in spite of which he died (Cushing 1985:22)

The exact reasons for the shooting are never explicitly detailed in Cushing's account of the incident, but neither the shooting or the verdict seemed to have adversely affected Torbert's

Year	Disease	Deaths <sup>1</sup>
1804	"okuu" (cholera?)	< 15,000
1818	"catarrhs and fevers"	60
1825	unnamed	"Great"
1826	influenza	"Thousands"
1839	mumps	"Great numbers"
1848-1849	measles, whooping cough, influenza	10,000
1853	smallpox	5,000-6,000
1857	influenza, dengue	"Many"
1870-1871	scarlet fever	"Great"
1878-1880	whooping cough	68
1881	smallpox	282
1888	whooping cough	104
1889-1890	measles, dysentery	26
1895	cholera	64
1899-1900	bubonic plague	61
1918-1920	influenza	1,700
1928-1929	cerebrospinal meningitis	68
1936-1937 <sup>2</sup>	measles	205

Figure 23. Epidemic mortality rates within the Hawaiian Archipelago demonstrating insufficiencies in detailed documentation prior to the late 1800s, from Schmitt (1977:58)

standing in the Honua'ula community. According to Cushing, "Torbert had lived several years in the district and bore among all classes an excellent character. [He] had, by his good habits and friendly conduct won the esteem of the natives" (Cushing 1985:22).

In early 1851, Torbert had become intolerant of the conditions of drunkenness in the town of Kalepolepo surrounding the nearest entrepot and landing located downslope of his *kula* plantation, acting as the closest port of sale for his *kula* produce. As part of an editorial responding to a proposed lightening of taxes on imported beer into Hawai'i, Torbert lends his account of the conditions at Kalepolepo to an unnamed "Pastor of Makawao" in *The Polynesian* (1851b:1) as follows:

Kula is full of potatoes, nearly ripe, of a fine quality...so that, with the blessings of God on good management there is nothing to prevent gains flowing in like a river...and yet there is danger that all these benefits will be counteracted by the beer shops at Kalepolepo, and other places along that shore. The people tell me they have great trouble with their teamsters... After a taste of the wretched beverage, they care little for their teams or for their loads; neglect all till they have filled themselves with this vile compound... They fill their kegs with the good creature, and take with them a sufficient quantity to make their friends drunk at home. Of this I have no doubt, and the fact is as alarming as it is shameful. (The Polynesian 1851b:1)

The decline of Kalepolepo entrepot may be the reason that L. L. Torbert began advertising the selling of his potatoes on commission from his plantation at Honua'ula starting in 1851 (The Polynesian 1851a) (Figure 24). Having worked in the region since the 1840's, Torbert used Honua'ula as a port of sale for his goods until at least 1855 (The Polynesian 1855b).

During his period of operation at Honua'ula, Tolbert was renowned for the quality of his goods. In the 1852 published meetings of the Royal Hawaiian Agricultural Society in a column appearing in *The Polynesian* (1852:2), Torbert was awarded third place in the islands for the quality of his sugar cane and first place for his Irish potato specimens. Several years later, Torbert was also awarded first place for the quality of beef (The Polynesian 1855a). Despite Torbert's excellent products, the Honua'ula plantation was put up for auction in mid-1855 (The Polynesian 1855b).

In 1862, Torbert moved to O'ahu, and died in Honolulu in 1871 at the age of 55 (The Hawaiian Gazette 1871; The Pacific Commercial Advertiser 1862). Although the growing and shipping operations by Torbert at Honua'ula were eventually closed, sugar would continue to be grown in the region by small growers, as well as by the East Maui Plantation and several decades later by the Nahiku Sugar Company.

### 2.4.3.3 The Stranger's Home of Wailuanui

The 4 September 1869 edition of *The Pacific Commercial Advertiser* provides an account of an August 1869 journey through East Maui from the harbor in Hāna to Central Maui by reporter "H.M.W." The account describes the lush landscape, referring to the region as "The Largest [Mountain] Apple Orchard in the World" and "The Switzerland of Hawaii" (The Pacific Commercial Advertiser 1869a:3).

THE BEST QUALITY  
of  
**IRISH POTATOES**  
IN ANY QUANTITY,  
at the  
**LOWEST PRICES,**  
on the  
**Shortest Notice.**  
by  
**L. L. TORBERT,**  
at  
**HONUULA, EAST MAUI.**

Cargoes bought on commission at \$1 50 per ton  
or 12 1-2 cents per bbl.

Enquire in *Honolulu* of A. P. Everett, or Makee,  
Anthon & Co.

There is a greater proportion of the RED pota-  
toes at Honuaula than at any other part of the po-  
tato region.

Honuaula is the most convenient anchorage at  
the Island of Maui, to get cargoes on board. 6m-17\*

Figure 24. Advertisement from *The Polynesian* (1851a:1) for L. L. Torbert's sale of commissioned potato cargo from Honua'ula



During the trip, heavy rains in Wailuanui created flood conditions that made the streams of the area impassable and the travelers were invited to stay at the house of Hiniau, described in the following passage:

Here we sought refuge in a neat native house, whose landlord, a well-to-do native, named Hiniau, invited us in, and urged us to stop for the night, as it would be impossible to cross the next stream, which was considered dangerous when swollen. This we found to be correct, as the river forms a narrow gorge, where the road passes, and the water tumbles through it from ten to twelve feet deep, compelling travelers to stop till it subsides, which it generally does as rapidly as it rises. Our host, who was an eccentric genius, decidedly loquacious and somewhat of a jester as we found, was full of praise of the resources of the valley and his house, which he called *hale malihini* or the Stranger's Home,- and on being interrogated, said he could furnish food in abundance such as fowls, pigs, fish, eggs, potatoes, taro, poi, pine-apples, oranges, bananas, &c. (The Pacific Commercial Advertiser 1869a:3)

In addition to characterizing the extreme abundance of resources that were locally available in Wailuanui, the traveler's account provides early documentation of how stream freshets affected access and travel through the region.

#### 2.4.3.4 The Growth of Early Sugar in East Maui

With the decline of the whaling industry in the Pacific in the mid- to late-1800s, the Hawaiian Islands attracted a new generation of managers, professionals, and entrepreneurs who would reshape the landscape for western enterprises and pursuits. Samuel T. Alexander and Henry Perrine Baldwin were prominent in this movement. Alexander had been sent from his family home at Lahainaluna to study at Oahu College (Punahou School) in Honolulu followed by studies at Williams College in Massachusetts. Alexander returned to Lahainaluna in 1862 as a teacher, and he is credited with using irrigation for improving the town's sugar cane and banana yields with his students (Dean 1950). Reverend Dwight Baldwin (1798-1886) had arrived in the Hawaiian Islands in 1831 and was stationed at Lahaina between 1835 and 1870. During the early 1850s, Rev. Baldwin had been granted 2,675 acres of land in northwest Maui. This land holding became the basis for enterprises expanding over areas of West Maui undertaken by his son, Henry Perrine Baldwin, during subsequent decades of the nineteenth century (Dean 1950).

With the ratification of the treaty of reciprocity with the United States in 1876, the future success of sugar in the Hawaiian Islands seemed assured. At that time, several small plantations in the districts east of Wailuku and Kahului and north of Makawao developed new plans to expand the growing of sugar. The Haiku Plantation, managed by Samuel T. Alexander, as well as the Paia Plantation of Henry P. Baldwin, and the Grove Ranch Plantation of T. H. Hobron all suffered from frequent drought. In 1867, S. T. Alexander proposed a massive construction project to bring mountain water from the streams of East Maui west to their plantations along the slopes of Haleakalā (Kuykendall 1967:64).

The stockholders of the Haiku Plantation agreed to back the project. On 30 September 1876, the government of Hawai'i gave permission to the plantations of Maui to take water from the principal six streams of the region and convey the water by ditch to their fields, for an annual rental

of \$100. The grant for the water was to last for 20 years, with the stipulation that the ditch construction be completed within the next two years (Kuykendall 1967:64). The system by which mountain water was brought from East Maui to the Haiku Plantation fields in Ha'ikū and further west onto the isthmus of Maui was the breakthrough that the sugar industry needed to flourish (Wilcox 1996:127).

The "Hamakua Ditch Company" was organized on November 2, 1876, and specifically allotted the shares and costs and the divisions of water to the various plantations, as thus;

The ownership, share of costs and division of water were 9/20ths Haiku Sugar Company, 5/20ths the Alexander and Baldwin Company, 2/20ths James Alexander, and 4/20ths T. H. Hobron. Construction of the Hamakua Ditch, which consisted of a combination of an open ditch, tunnels and iron pipes, was carried on throughout 1876-1877. Funding for the project was accomplished by the agency of Castle & Cooke. Castle & Cooke agreed to finance the project, with the belief that Samuel Alexander and Henry Baldwin could bring the ditch project in for between \$25,000 to \$50,000 (Kuykendall 1967:64).

Thrum (1877:39-42) in *Hawaiian Annual and Almanac for 1878*, published a description of the project:

The digging of the ditch was a work of no small magnitude. A large gang of men, sometimes numbering two hundred, was employed in the work, and the providing of food, shelter, tools, etc., was equal to the care of a regiment of soldiers on the march. As the grade of the ditch gradually carried the line of work high up into the woods, cart-roads had to be surveyed and cut from the main road to the shifting camps. All the heavy timbers for flumes, etc. were painfully dragged up hill and down, and in and out of deep gulches, severely taxing the energies and strength of man and beast, while the ever-recurring question of a satisfactory food supply created a demand for everything eatable to be obtained from the natives within ten miles, besides large supplies drawn from Honolulu and abroad. (Thrum 1877:39-42)

When construction got under way, Sam Alexander and Henry Baldwin began to find out what a monumental job they had tackled. Torrential rains and landslides plagued the project. Workers had to hack their way through jungle and descend sheer cliffs by rope. When the men balked at the final barrier of the sheer drop of over 300 feet at the Māliko Gulch, Henry Baldwin, who had lost an arm in a sugar mill accident, shamed them into returning to work by sliding down a rope with his one good arm (Taylor et al. 1976:87).

In July 1877, the first water began flowing through the ditch. It reached the parched Haiku Plantation 24 hours later – barely one day before the deadline set in the royal grant. Approximately 60 million gallons of water a day were soon running through the aqueduct system. The ditch had cost \$80,000, which was paid for by Castle & Cooke. At the same time that the success of the Hamakua Ditch became known in the islands, the wealthy refiner of beet sugar in San Francisco, Claus Spreckels, arrived in Honolulu. Seeing the early success of the Alexander and Baldwin partnership, Spreckels moved fast to do business with the sugar growers of Hawai'i. Within three weeks, he had bought more than half the sugar crop of 1877 and was laying plans to take over the industry as a one-man monopoly (Taylor et al. 1976:87).

Spreckels had watched the Hamakua-Haiku Ditch development on Maui with special interest, hoping it would fail so that he could pick up the pieces. Anticipating the success for the future of sugar at East Maui, Spreckels acquired 8,000 acres of barren plain adjacent to Ha'ikū and the Alexander & Baldwin properties. He then leased 24,000 acres of Crown land in Wailuku through an agreement with a prominent member of the royal family. In 1882, Spreckels was able to obtain title to these lands in fee simple. All he needed was water. Here, Spreckels turned to his friend, Kalakaua; the newly-elected king of the Hawaiian Islands. Kalakaua dismissed his cabinet, whom had previously turned down Spreckels' application for water from the same general area as Alexander & Baldwin's Hamakua Ditch. A new cabinet was appointed by the king, who then approved a new right to water for Spreckels. Spreckels went on to build his own ditch and develop his Maui lands into a profitable sugar plantation (Taylor et al. 1976:88-89).

Spreckels was quick to consolidate his gains. His sugar venture on Maui was named "Hawaiian Commercial & Sugar Company," His expenditures on irrigation and mill machinery were lavish, and his Spreckelsville plantation was nothing short of magnificent. When Claus Spreckels received permission to the use of water found in East Maui, he built his own ditch from Honomanū stream to Maui's south shore (Wilcox 1996).

#### 2.4.3.5 The Rise of Commercial Enterprise in Hāna

A 2 February 1897 article in *The Hawaiian Star* discusses the future of the Hāna region from the perspective of the continued growth of industry and commerce in Hawai'i at the turn of the century (The Hawaiian Star 1897). Hāna and the undeveloped slopes of East Maui are described as one of the last natural environments remaining in the State in the following excerpts:

The district of Hana is one of the least known to the general public of any districts on the Islands. Beyond the fact that there are three sugar plantations, viz: Hana, Reciprocity and Kipahulu, the average citizen of Honolulu knows very little about it. It is one of the districts that, like Kona and Puna, will one of these days awake out of sleep.

The prospects of the Hana district are good. The sugar plantations lie on the belt of the undulating land at the extreme east of the Island. To the northwest of Hana Plantation there is an extent of country stretching for twelve or fourteen miles, which, at one time, supported a large population, but which at present time has only a scattered villages here and there.

The energy to develop these lands must come from without, it can never come from within. Again, it is not only energy and capital that are required, but roads. The roads of the portion of the Hana district have hardly been touched since the days of Dr. Judd, who, so far as memory serves, had the present so-called road constructed. (The Hawaiian Star 1897:4)

The ambition for successful commercial cultivation in East Maui continued to be the focus of all endeavors throughout the mid- and late-1800s. Sugar, coffee, and rubber plantations were started throughout the region with high hopes of success. A 19 December 1898 article in *The Hawaiian Star* documents a large land sale in Nāhiku and describes the beginning of "the awakening" of the region to foreign industry in the following excerpts:

The land sale which took place at Paia on Saturday afternoon, December 17<sup>th</sup>, was indeed a phenomenal one. There were three lots for sale, and each of them sold for a little over five times the appraised price.

The lands in question are situated in Nahiku among the Palis of East Maui. A couple years ago it would have been hard to give the land away and no one wanted it, unless the chances of permanent government and therefore capital were assured. So the land lay a waste of guava scrub, ferns, ohia, kukui, lauhala and so forth. The thundering waterfalls crashed over the cliffs and the streams roared over their rocky beds to the ocean, with no tribute to the soil in the shape of irrigation. For miles there would be no habitation.

Now all this is being changed. The district, one of the most fertile on the Islands, awakes out of its lethargy. The valleys which have only heard the roar of the cataract and the rush of the stream will wake to the sound of the steam whistle and the ax, and man will enter upon his kingdom. Cultivation and civilization will reign, but the wild beauty of the Koolau district will be gone. Again this is progress under annexation. (The Hawaiian Star 1898)

#### **2.4.3.6 East Maui Irrigation Company**

The East Maui Irrigation Company (EMI) Aqueduct System was constructed to deliver water from the abundant watersheds of East Maui into coastal and central isthmus plantations to aid in sugar production. The EMI Aqueduct System has been in use for over 134 years and continues to collect water today for both private and municipal entities. The EMI Aqueduct System, at this time, contains 50 miles of tunnels, 24 miles of open ditches, 13 inverted siphons and flumes, and approximately 388 intakes. In addition, the system is served by approximately 62 miles of private roads, and a solar powered radio telemetry system to monitor ditch flow. The catchment begins at roughly 1,300 ft elevation and delivers water to Central Maui at an elevation of 1,150 ft, covering 18 miles from its western to eastern extent.

Built at a time when Hawai'i was still an independent kingdom, the EMI Aqueduct System was the first of its kind both in the Pacific and on the West Coast of the U.S. It is also the largest privately financed, constructed, and managed irrigation system in the U.S. The initial construction of the first section of the aqueduct system in the 1870s, named Old Hamakua, began the engineering trend of catchment ditches that would later fuel the sugar industry on Kaua'i, O'ahu, Hawai'i, and Maui, making sugar the major economic sector of Hawai'i for over a century. The aqueduct system itself is composed of a mosaic of multiple smaller ditches, all built at different times by different groups of financiers and engineers (ASCE 2001).

Hawai'i was moving through many economic and demographic shifts in the late 1800s following the intensification of Western commerce, including the continued drift of rural populations toward town centers, which made water a highly contested and protected resource on islands such as O'ahu where these demographic trends were most pronounced. This is largely because water had to be diverted from distant watersheds to support growing cities. The legality surrounding watershed catchment was continuously challenged for leaving too-little water for residents where streams were diverted by the government (Wilcox 1996). Regardless of the dismay this may have caused, the costs of abandoning water catchment had to be carefully balanced by



the Kingdom, since much more than the municipal water supply hung in the balance. In *Sugar Water: Hawaii's Plantation Ditches*, Carol Wilcox (1996:27) states:

Hawaii moved steadily through this transition because it always had something that it could trade. At first the orient traded for Hawaiian sandalwood; then the whaling fleet needed crew and provisions; there was California Gold Rush market; the westerners wanted land-and these commodities all became available. Both the markets and the resources, however, were limited, and before long they were "used up." Unless it developed a new commodity, Hawaii ran the risk of becoming a political and economic non-entity, a backwater nation. This did not fit the vision that the monarch, the resident haole, or the people had for the future of the kingdom. (Wilcox 1996:27)

The prospect of growing sugar in Hawai'i was very appealing to the Kingdom as it would provide a renewable economic base. This view was further exemplified in 1876 by "An Act to Aid the Development of the Resources of the Kingdom" in which eminent domain rights reserved for public purposes (such as water) could be applied by the government to private enterprises for the development of sugar (Wilcox 1996). Along with the Reciprocity Act of 1876 that allowed the duty-free export of Hawaiian sugar to the mainland U.S., the groundwork had been set for the start of the sugar industry in the archipelago (ASCE 2001). This new industry would require a vast amount of water as exemplified by the poem about sugar cane named *The Crop* by Beryl Blaich: "And water, all the water you can find, dig, direct, scrounge, divert, tunnel and hold. Bring the water tribute to me, King Cane" (Beryl Blaich in Wilcox 1996:v).

Old Hamakua, the first catchment marking the start of the EMI Aqueduct System, was constructed during the reign of King Kalakaua. This section of ditch was constructed by Henry P. Baldwin, Samuel T. Alexander, and James M. Alexander between 1876 and 1878 under the name of the Hamakua Ditch Company. The result of the project was 17 linear miles of non-lined ditch finished in the last days of the deadline imposed by the Kingdom (Wilcox 1996). This ditch was servicing Ha'ikū fields by July 1877 with the water it harvested from Kailua, Hoalua, Huelo, Hoolawa, and Honopou streams on its way to the terminus at Nailiilihaele Stream.

The second addition to the aqueduct system was the Spreckels Ditch, also known as the Haiku Ditch, constructed between 1879 and 1880. The lease granted to Spreckels gave him rights to all water not already in use by 30 September 1878, the same date as the deadline for the completion of the Old Hamakua Ditch. Taking advantage of his unrestricted access to all streams not currently under collection, the Haiku Ditch was twice as long, three times as large, carried 50 percent more water than the Hamakua Ditch, and stretched from Honomanū Stream to the Kīhei boundary (Wilcox 1996). The ditch was 30 miles long and could deliver up to 60 million gallons per day (mgd), costing nearly half a million dollars by the time it was completed (ASCE 2001). The breadth and scale of this endeavor would redefine standards of water collection for the sugar industry in Hawai'i. The massive Haiku Ditch was the first developed by a foreign engineer, named Herman Schussler, a trend that would continue for all future additions to the EMI Aqueduct System (Wilcox 1996). Shortly after Spreckels formed the Hawaiian Commercial and Sugar Company (HC&S), construction also began on Center Ditch (1898), Manuel Luis Ditch (1900), and the Lowrie Ditch (1899-1901) by Schussler (ASCE 2001).

In 1898, Spreckels lost controlling interest of HC&S to the agency of Alexander & Baldwin, who took up and completed construction of the Manuel Luis and Lowrie ditches. Along with the Center Ditch, these two sections completed a lower elevation catchment running through the Hāmākua Loa and Koʻolau regions. Most notable was the Lowrie Ditch, sometimes called the Lowrie Canal, named after the manager from the HC&S plantation and mills at Spreckelsville, William J. Lowrie. The 22 mile-long Lowrie Ditch could deliver 60 million gallons per day and contained seventy-four tunnels (totaling 20,850 ft, with a single tunnel of 1,955 ft), 19 flumes (totaling 1,965 ft), and 12 siphons carrying water from distant Honomanū Valley to the central isthmus (Figure 25). This ditch was also engineered by a foreign expert, E. L. Van Der Neillen, and constructed by Japanese laborers under the direction of Carl Jensen (Wilcox 1996).

Following the completion of the Manuel Luis/Center/Lowrie Ditch extensions, the next large irrigation project for the Hamakua Ditch Company would be the Koolau Ditch, constructed between 1904 and 1905 by M. M. O'Shaughnessy. This extension of irrigation catchment reached an additional 10 miles toward the Hāna Region and consisted of 7.5 miles of tunnel and 2.5 miles of open ditch and flume. Given the extreme difficulty of working in the narrow and deep gulches of the region it was necessary to build a road alongside the ditch where it passed into tunneled rock, the span of these borings ranged from 300 to 2,710 ft in length (Wilcox 1996). It is this road that was famously travelled by author Jack London in 1905 (The Honolulu Advertiser 1914). This newest ditch section extended out to Makapipi Stream in Nāhiku and cost the Hamakua Ditch Company \$511,330 to complete. The Koolau Ditch was constructed concomitantly with the New Hamakua ditch, transferring the Koʻolau water further west toward Hāmākua Loa, located parallel to the Lowrie ditch but further upslope (Figure 26) (Wilcox 1996).

In 1908 the Hamakua Ditch Company was succeeded by their new business entity, EMI. The purpose of this new entity was to develop and administer the surface water collection for all plantation entities under the Alexander & Baldwin umbrella, including the newly acquired Kīhei Plantation. Shortly after this transition, in 1912, EMI added lining to the Koolau Ditch bed and started construction on the Kauhikoa Ditch. The Kauhikoa Ditch collected the water originating in the Koolau/New Hamakua ditches and carried them further west through Haʻikū, Pāʻia, and further out to Puʻunene in the central isthmus. This newest extension was completed in 1915 at 29,910 linear ft and carrying 110 million gallons per day. Shortly after starting the Kauhikoa Ditch EMI also started construction of the New Haiku Ditch in 1913. Construction of this lower altitude ditch, running from Halehaku gulch in Peahi to dry North Kīhei, was completed in 1914 with a finished length of 54,044 ft and a daily delivery of 100 mgd. The much longer New Haiku Ditch was completed faster than its Kauhikoa contemporary as the terrain it had to traverse was less severe (Wilcox 1996). Plans for the last major addition to EMI's catchment system, the Wailoa Ditch, was started in 1918. By the time this ditch was completed in 1923 it was the highest capacity channel in the entire network and had a greater median flow than any natural river in Hawaii. The Koolau Ditch was connected to the new Wailoa section, being diverted away from the New Hamakua Ditch, and connected to a series of hydro-electric power plants on the north shore of Maui (Figure 27). The Wailoa Ditch consists of 51,256 ft of mostly lined tunnel, and its water capacity ranged from 160 mgd upon completion to a later increased capacity of 195 mgd. This ditch ran parallel to, and above, the earlier New Hamakua and Kauhikoa Ditches (Wilcox 1996).



Figure 25. Surface water collection along the walls of Honomanū Valley (Wilcox 1996)





Figure 26. Koolau Ditch water diversion at Piinaau stream (Courtesy of EMI)

LRFI for Nāhiku, Ke‘anae, Honomanū, and Huelo License Areas, Multiple Ahupua‘a, Makawao and Hāna, Maui  
TMKs: [2] 1-1 (various plats and parcels), 1-2-004:005, 007 (por.), and 2-9-014:(various parcels)



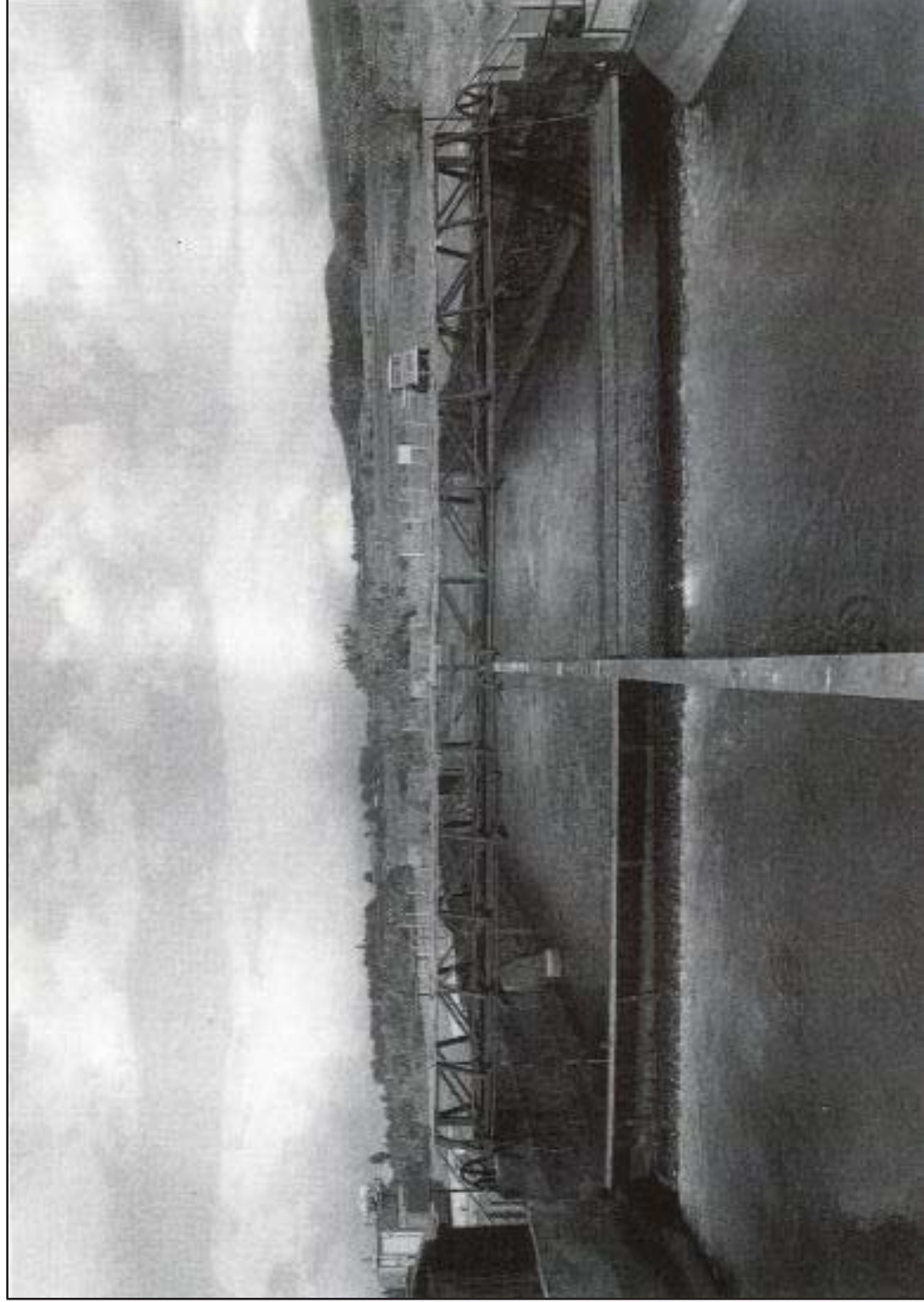


Figure 27. Wailoa forebay, a section of Wailoa Canal that drops into a low-head hydro-electric power plant (Wilcox 1996:118)

LRFI for Nāhiku, Ke‘anae, Honomanū, and Huelo License Areas, Multiple Ahupua‘a, Makawao and Hāna, Maui

TMKs: [2] 1-1 (various plats and parcels), 1-2-004-005, 007 (por.), and 2-9-014:(various parcels)

Upon completion of the major ditch features, EMI commanded the runoff water of a combined 50,000 acres, of which EMI owned 17,000 acres and the State of Hawaii owning the balance and directed it toward their 30,000-acre sugar plantation and into various municipalities. Accompanying the water collection infrastructure were 12 siphons, 62 miles of road, 15 miles of telephone line, and numerous small feeders, dams, reservoirs, intakes, pipes, and flumes (Figure 28). The totality of the collection system was managed by four license areas (Huelo, Honomanū, Ke‘anae, and Nāhiku) that dictated the circumstances and conditions under which EMI could collect the runoff from the various Government lands it crossed. The development and improvement of the EMI Aqueduct System over time has cost nearly \$5,000,000, compared to its modern assessment of nearly \$200,000,000 to create a comparable system.

#### 2.4.3.7 Nahiku Sugar Company

In the late 1890s, sugar was grown in the Nāhiku region of East Maui by the Nahiku Sugar Company. Smaller sugar growers likely planted in the region prior to the establishment of this larger plantations due to the proximity of the area to the Makapipi Stream watershed. From the beginning, water rights for the Makapipi watershed were jointly shared between the Nahiku Sugar Company and multiple homesteaders who collectively formed the body of the company's sugar growers. The business of growing sugar at the plantation in Nāhiku was also dependent upon local farmers in that a significant portion of the land under cultivation by the company was deeded to the same homesteaders who held a portion of the water rights (Honolulu Advertiser 1902:2). For a brief period, the Nahiku Sugar Company was acquired by Alexander & Baldwin. In early 1899, Alexander & Baldwin took 250 shares and were appointed agents for the 370-acre Nahiku Sugar Company. Even with significant financial backing, profits declined, and by mid-summer 1900 development work on the plantation had stopped.

In addition to the day-to-day operations, the Nahiku Sugar Company completed the construction of a landing for the Territorial Government of Hawaii in 1901 and constructed rail lines for a derrick at the landing. There is no record of the use of locomotives on the rail lines that were constructed, although the neighboring Hana Plantation began railroad operations in 1883 (Conde 1993:30). The construction of the landing at Nāhiku placed the plantation owners in additional financial hardship, and in the House of Representatives general assembly on Tuesday 25 June 1901, the *Honolulu Advertiser* reported that it was agreed upon that “the amount expended on Nāhiku landing be paid the incorporation by the Government, at whose suggestion the landing had been taken in hand and finished” (1901b:9-14). Deferring the landing's construction cost to the Government proved to be of minimal short-term financial benefit to the company.

In 1902 local homesteaders petitioned their Congressman, Delegate Wilcox, not to grant additional water rights to the Nahiku Sugar Company that would infringe on the already established rights of the local farmers who had since had a falling out with the Company. Water rights and land were shared from the start, so when local homesteaders refused to plant additional cane for the mill in response to a perceived threat to their individual water rights, the Nahiku Sugar Company petitioned for additional water rights from neighboring watersheds in inaccessible gulches to the northwest to supplement the shortage. Since the initial licenses were upheld, and the homesteaders' rights protected, the Nahiku Sugar company was forced to “either get more land under cultivation, or the plantation must be given up” (Honolulu Advertiser 1902:2).



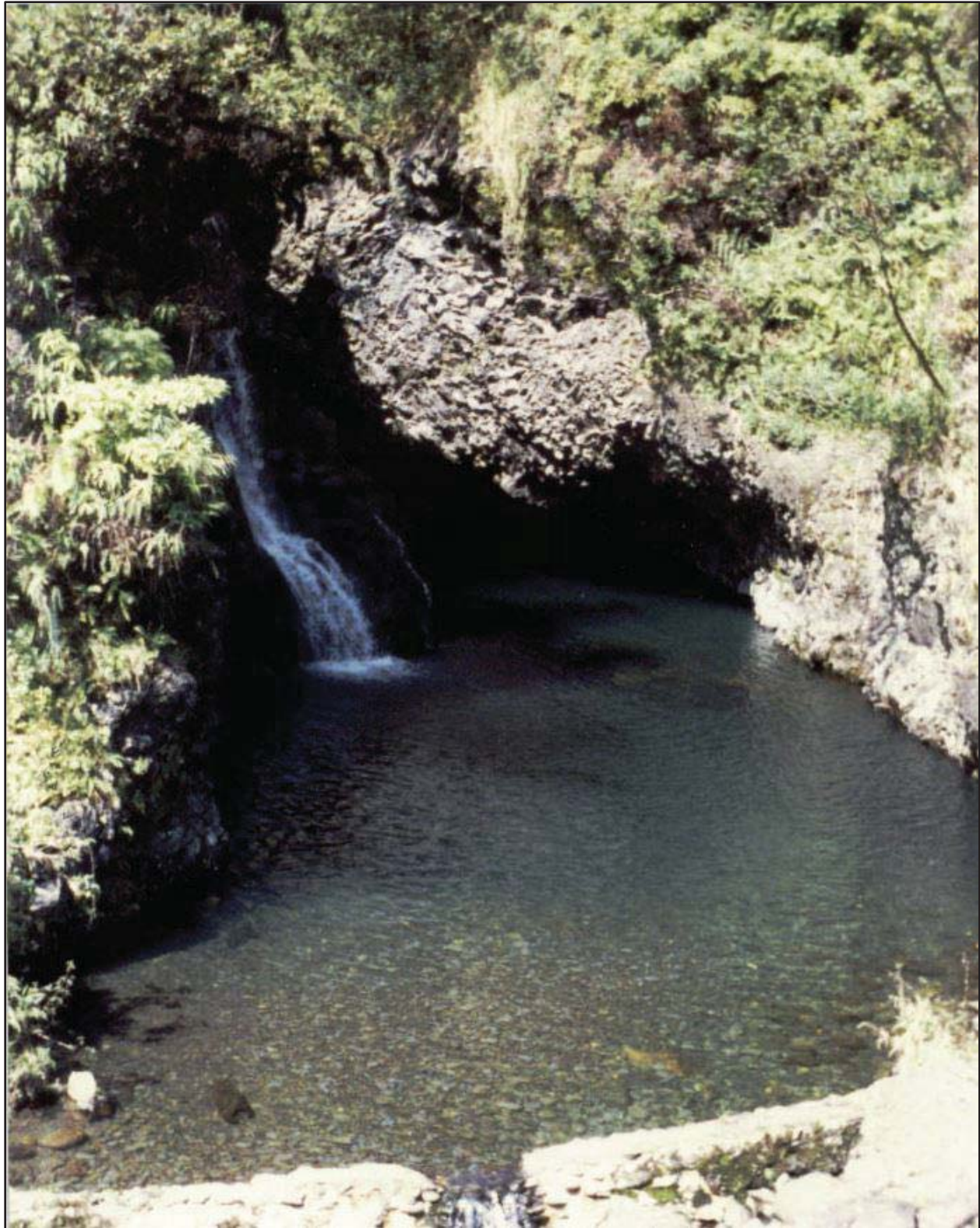


Figure 28. Collection of water at Hanawi Dam near Ke‘anae (Courtesy of EMI)

Eventually, the founding homesteaders gave up on the Sugar operation altogether, putting the company at risk of collapse due to insufficient land and water access for continued cane cultivation. In a *Honolulu Star Bulletin* article dated 24 July 1943, Mrs. Shaw, widower of a Nahiku Sugar Company homesteader, summarized the failed operation as follows:

Mr. Shaw and I moved from Paia, Maui, to our newly acquired homestead of 125 acres at Nahiku, on the windward side of Maui. At that time the land was in its virgin state and unimproved...and Mr. Shaw planted cane for the Hana plantation while plans were being developed for the Nahiku Sugar Co. The prospects for this new company were so promising that all those owning land there were planning to plant for the newly organized plantation, but unfortunately the company failed. In 1903 we had to vacate our homestead and came back to Honolulu. (*Honolulu Star Bulletin* 1943:6)

In 1902, a merger was planned with the Hana Sugar Plantation by which the plantation would pay an annual rental of \$4,500 over a 26-year lease which included a valuable set of water rights (Thompson 1902:272). In 1904, Alexander & Baldwin bought out all the remaining stock in the Nahiku Sugar Company (Dean 1950:62). Efforts were made by the company to diversify their planting operations, potentially adding a new income stream to the business by dedicating ten percent of their arable land (200 acres) to the cultivation of latex rubber (*Pacific Commercial Advertiser* 1910). The rubber industry had a short boom in the region around this time with several other rubber plantations opening around the Nahiku Sugar Company. Attempting to capitalize off this new regional industry did not pan out for the company, since in the years leading to 1920, all rubber plantations in the area had closed (see Section 2.4.4.2 Nahiku Rubber Plantations). Eventually, all the former sugar plantation land at Nāhiku was acquired by HC&S and EMI under the parent corporation of A&B (Hatch 1922:1410).

#### 2.4.4 1900s

According to the Census Bulletin of 1900, the population of Hāna District was reported to be 5,276 and the population of Makawao District was reported as 7,236 (Thrum 1909a:18). The Board of Health reported 755 births and 422 deaths in Maui County in the year 1900 (Schmitt 1977:13). An interesting population dynamic of this period of time is that while the populations of the Wailuku and Makawao districts continued to grow by at least a thousand inhabitants every ten years, there is a corresponding negative effect on the population of Hāna. Official census figures have the Hāna population shifting from 5,276 persons in 1900 to only 969 persons in 1970 (Schmitt 1977:13-14). While disease and urban drift may play a role in these figures, there is also the added regional strain of the establishment, and subsequent collapse, of agricultural industries throughout the East Maui region. While East Maui was originally slotted for agrarian development in the eyes of the early developers, this industry would, during the course of the twentieth century, gradually give way to tourism as its primary draw to visitors and businessmen.

A feature section in the 4 September 1910 edition of the *Honolulu Advertiser* documents an August 1910 tour through the Hāna District of Maui by H.M. Ayres, a reporter for the paper (*The Honolulu Advertiser* 1910:13). The tour, which began on the government road and then continued along the Ko'olau Ditch trail, provides a first-hand account of the region, albeit from an outsider's perspective, along with photographs of homesteads, homesteaders, landscapes, and prominent structures. While passing through Honomanū Gulch, Ayers relates "...there is none more



impressive in the islands. Its beauty baffles description and were its attractions name widely known, tourists in plenty would assuredly visit..." (The Honolulu Advertiser 1910:13). Continuing along the ditch trail to Ke'anae, Ayers stopped at the house of Halemano and recounts the following observations of life in Ke'anae:

At the house of Halemano we were made very welcome, supper being ordered by our host at a Chinese restaurant nearby. He naively remarked that poi and fish were no good for haoles. Halemano, who is postmaster and political boss of the precinct, is a dignified old native. His house is on the campaign circuit and when election time rolls round there are stirring times at his residence. His daughter, Aunie, is easily the belle of the district.

Many of the Keanae girls have Chinese husbands and appear to be quite happy with them. They are better providers than the Hawaiians and this probably accounts for the phenomena.

Before leaving Keanae we offered to buy a squid stone from Halemano but the old man refused to part with the relic, declaring that it was his wife's and that he didn't need the money—a rare thing with the average Hawaiian today.

While we were in Keanae the natives were conspicuous by their absence. Returning for some article that I had forgotten, after my departure, I found quite a gathering discussing the business of the malihini haoles while across the rice fields men, women, and children were hastening toward the house of Halemano. (The Honolulu Advertiser 1910:13)

Nāhiku was the next stop on the tour for Ayers who was welcomed by C.S. Austin, manager of the American-Hawaiian Rubber Company. Ayers described the rubber industry in Nāhiku (described in greater detail in subsequent sections) and provides the following account of the work and resources in the region:

There is a very good class of Hawaiian at Nahiku, industrious and contented. The rubber affords them more or less constant employ and fish are very plentiful off the shore. The natives working for Mr. Austin regard him as a friend. He speaks their language fluently and both he and his mother have, by their helpful attitude, endeared themselves in the hearts of the Hawaiians of Nahiku. (The Honolulu Advertiser 1910:13)

The account of Mr. Ayers illustrates a significant degree of social interaction and integration between the lifestyles of the Native Hawaiians, *haole* (foreign) businessmen, and the various ethnic laborers and homesteaders that had adopted the region as home. Though agrarian industries were still trying to scratch profits from the rocky slopes of Makawao and Hāna District's coastal plantations at this time, the makings of East Maui as a destination of note for travelers to the islands was in the making. Tourist activity would become more frequent with the advancement of local infrastructure into the region, eventually supplanting agriculture as the economic cornerstone of the region.

### 2.4.4.1 Jack London

In the summer months of 1907, renowned travel writer Jack London and his second wife Charmian, stopped at Maui on the South Pacific portion of their sailing trip around the world to travel the ditch trail across the Hāna District. His horseback travels around Haleakalā and overland to Hāna appeared in his book “The Cruise of the Snark,” a non-fiction account of London’s travels and experiences during their world tour that was published in 1911. In select excerpts from London’s book reprinted in *The Honolulu Advertiser* (1914:10) the beautifully rugged East Maui coast is described as follows:

The windward side of Haleakala is serried by a thousand precipitous gorges, down which rush many torrents, each torrent of which achieves a score of cascades and waterfalls before it reaches the sea. More rain comes down here than in any other region in the world... Hundreds of inches of rain annually, on fertile soil, under a tropic sun, means a steaming jungle of vegetation. A man, on foot, cutting his way through, might advance a mile a day, but at the end of a week he would be a wreck, and he would have to crawl hastily back if he wanted to get out before the vegetation overran the passage way he had cut. (Jack London in *The Honolulu Advertiser* 1914:10)

London also observed the lay of the land near the Ko‘olau Gap in Haleakalā Crater, travelling into Hāna, Ke‘anae, and eventually Nāhiku. As a keen observer and seasoned writer, London took notice of the abundance of water flowing from the local watersheds. London also inspected the rubber plantation at Nāhiku and traveled by way of the Nāhiku Ditch Trail, of which he commented:

Water means sugar, and sugar is the backbone of the Territory of Hawaii, wherefore the Nahiku Ditch, which is not a ditch, but a chain of tunnels. The water travels underground appearing only at intervals to leap a gorge, travelling high into the air on a giddy flume and plunging into and through the opposing mountain. This magnificent waterway is called a “ditch,” and with equal appropriateness can Cleopatra’s Barge be called a box-car... There are no carriage roads through the ditch country, and before the ditch was built, or bored, rather, there was no horse-trail... O’Shaughnessy was the daring engineer who conquered the jungle and the gorges, ran the ditch and made the horse-trail. He built enduringly, in concrete and masonry, and made one of the most remarkable water-farms in the world. Every little runlet and dribble is harvested and conveyed by subterranean channels to the main ditch. But so heavily does it rain at times that countless spillways let the surplus escape to the sea. (Jack London in *The Honolulu Advertiser* 1914:10)

Turning his attention from water collection of the Nāhiku Ditch to the engineering feat of the ditch trail running alongside of it, London comments on the trials of the passage:

The horse trail is not very wide. Like the engineer who built it, it dares anything. Where the ditch plunges through the mountain, it climbs over: and where the ditch leaps a gorge on a flume, the horse trail takes advantage of the ditch and crosses on top of the flume. That careless trail thinks nothing of travelling up or down the face of precipices. It gouges its way out of the wall, dodging around waterfalls or passing under them where they thunder down in white fury; while straight overhead the

wall rises hundreds of feet and straight beneath it sinks a thousand... The only relief from the flumes was the precipices; and the only relief from the precipices was the flumes, except where the ditch was far underground, in which case we crossed one horse and rider at a time, on primitive log-bridges that swayed and teetered and threatened to carry away... The ceaseless iteration of height and depth produced a state of consciousness in which height and depth were accepted as the ordinary conditions of existence; and from the horses back to look sheer down four hundred or five hundred feet became quite commonplace and non-productive of thrills. And as carelessly as the trail and the horses, we swung along the dizzy heights and ducked around or through the waterfalls... I advise only those with steady nerves and cool heads to tackle the Nahiku Ditch trail. (Jack London in *The Honolulu Advertiser* 1914:10)

Some of the heights experienced by riders on London's overland expedition were said to have shaken even the steadiest nerves. London relates an incident involving a lifelong cowboy from a local ranch with a reputation for fearlessness, having to dismount his horse while crossing a particularly deep gorge on a flume, gladly surrendering his reputation for the security of knowing he would be returned safely to his wife and children (*The Honolulu Advertiser* 1914).

The creator of the aqueduct system and its horse trail traveled in London's narrative, Michael M. O'Shaughnessy, was considered at the time the world's foremost irrigation engineer. O'Shaughnessy arrived in the Hawaiian Islands in 1899, and engineered the 1904-1905 Ko'olau Ditch through Nāhiku, referred to by London as the "Nahiku Ditch" (Wilcox 1996:117). Of the condition surrounding the construction of this section of the Ko'olau Ditch and its accompanying trail, O'Shaughnessy reported:

The country was so steep and precipitous that little ditching could be employed, and it was necessary to make four and one-half miles of wagon road and eighteen miles of stone paved pack trails to facilitate during construction the transportation of supplies. About 4000 barrels of cement and 100,000 pounds of giant powder were used. In all, ten mountain streams are intercepted, which are admitted into the main aqueduct through screens of grizzly bars spaced three quarters of an inch apart (O'Shaughnessy in Wilcox 1996:117)

London's visit to East Maui could not have been better timed and his observations more appropriate considering the ongoing development of agricultural endeavors in the Hāna District. Surely his descriptions of the local watersheds, his experiences in plantation communities, and the feats of engineering that connected them would reach many readers abroad by way of his penmanship. Even the impressive engineering feats London witnessed in this environment could not detract from the wildness of the surrounding countryside he observed:

The vegetation ran riot over that wild land. There were forests of koa and kolea trees, and candlenut trees... Wild bananas grew everywhere, clinging to the sides of the gorges, and, overborne by their great bunches of ripe fruit, falling across the trail and blocking the way. And over the forest surged a sea of green life, the climbers of a thousand varieties, some that floated airily, in lacelike filaments, from the tallest branches; others that coiled and wound about the tree like huge serpents; and the one, the ie-ie, that was for all the world like a climbing palm, swinging on

a thick stem from branch to branch and tree to tree and throttling the supports whereby it climbed... In fact, the ditch country is nothing more nor less than a huge conservatory. Every familiar variety of fern flourishes, and more varieties that are unfamiliar, from the tiniest maidenhair to the gross and voracious staghorn, the latter the terror of the woodsmen, interlacing with itself in tangled masses five or six feet deep and covering acres. (Jack London in *The Honolulu Advertiser* 1914:10)

London's visit to the Nāhiku Ditch trail and to East Maui capture both the wildness of the countryside and the efforts of twentieth century business men to tame it in the name of commerce. The living in this area was rough and isolated, a fact that would become better known to the many agriculturalists who called Nāhiku their home during this period of plantation development in the area. Even with the collapse of the Nahiku Sugar Company's planting operations around the same time, the wild country with its abundant water and volcanic soils would continue to be a powerful draw for agriculturalists seeking their fortunes.

#### 2.4.4.2 Rubber Plantations in Nāhiku

In the early 1900s, Nāhiku became the site for several competing rubber plantations attempting to serve a growing demand for rubber used in automobile tires (Lindsay 1907:289-290). The *Hawaiian Gazette*, in a 1906 article, detailed the prospective changes to the region resulting from the introduction of rubber a year prior:

A little over a year ago a few homesteaders dwelt in Nahiku, living on their land chiefly because they hadn't money enough to go elsewhere. Wild bananas gathered in the jungles, mixed with guavas from the lower hillsides and washed down with milk from the cattle that wander in the forest, this was their means of subsistence. But the last year has demonstrated that rubber trees will grow in the district and the Nahiku of a year ago would scarcely be recognized now. (*Hawaiian Gazette* 1906:6)

Rubber planting was welcomed into the community by the residents as an avenue to bring income to the region after the closure of the nearby sugar plantation. With the local Nāhiku Sugar Company's difficulties in growing commercial sugar in the area, the Nāhiku region fell into a state of "innocuous desuetude...so the district has lain idle and the residents there have grown poorer and poorer until many families were on the verge of starvation" (*Hawaiian Gazette* 1906:6) Outlook for the profitability of rubber was good according to industry experts. R. H. Anderson, having studied rubber cultivation in Brazil, the West Indies, and Mexico, made a visit to Nāhiku in 1905 to survey the environmental conditions. During this visit Anderson planted a handful of rubber trees to monitor their growth rate, and tapped several existing trees serving as shade near Nāhiku Landing to gauge latex output of local rubber. After witnessing good latex flow from the mature trees near the landing, and the several feet of growth of his experimental saplings in just a few short weeks following heavy rains, Anderson was convinced that "rubber trees would not only grow, but would produce rubber" (*Hawaiian Gazette* 1906:6). This visit by Anderson set the stage for the emergence of the rubber industry as attested by the *Hawaiian Gazette* nearly a year later:

That little grove of trees planted by Mr. Anderson in January, 1905, is now a thriving young orchard...so high that a man on horseback may ride beneath their



lower branches without bending his head. And other orchards are being planted all along the nearby slopes of Haleakala, the primeval forest is falling before the axes of forces of laborers, and little rubber saplings from a foot to ten or eighteen feet in height are springing up everywhere to eventually clothe the mountain sides. (Hawaiian Gazette 1906:6)

Four chief rubber companies operated in the region by 1907, with all companies dedicating a combined total of 1100 acres to the cultivation of cerea (*Manihot glaziovii*) and hevea (*Hevea brasiliensis*) rubber tree varieties, with the former being favored over the latter due to its high “first returns” (Pacific Commercial Advertiser 1910:9-12). The first plantations to open in the region were the Nahiku Rubber Company and the Koolau Rubber Company in 1905, followed a year later in 1906 by the opening of the Hawaiian-American Rubber Company and the Alexander & Baldwin-owned Nahiku Sugar Company, who began cultivating rubber trees on former cane land. When taken together, the combined plantings of the four major companies were more than 280,000 individual rubber trees, with the fields being tended by Japanese, Portuguese, and Hawaiian laborers living in the region as homesteaders or in plantation labor camps. Growing rubber was a difficult business to start in Nāhiku considering that the average maturity rate for a rubber tree is between three and five years, resulting in the first ‘experimental’ tapping of these crops in 1910 to determine quality, and not emerging onto the national market until a sizable crop could be harvested in 1911. Some companies, such as the American-Hawaiian Rubber Co., attempted to diversify their plantation by cropping corn in the spaces between the furrows of rubber trees in an effort to offset the costs associated with the long wait for the rubber trees to reach productive maturity (Pacific Commercial Advertiser 1910). Attempting commercial agricultural operations in a region as isolated as Nāhiku in the early 1900s proved to be an insurmountably difficult undertaking for the growing rubber enterprise on East Maui.

#### 2.4.4.2.1 *The Nahiku Rubber Company*

The Nahiku Rubber Company was in operation as early as 1905. As the first rubber plantation on Maui, the Nahiku Rubber Company sought to spearhead the new burgeoning demand for rubber on the international market. At the time of the company’s founding, automobile manufacturing was a booming industry and automobile tires cost the average consumer between \$25 and \$40 a piece “because rubber was scarce and expensive, most of the world supply being gathered from wild trees in the Amazon valleys of Brazil” (Smith 1943:10). Accompanying literature of the time regarding the cultivation of rubber in the tropical British Colonies of Malay and Ceylon was filled with highly optimistic accounts of the big profits to be made in the industry. Expecting significant returns from the undertaking the Nahiku Rubber Company, promoters purchased approximately 900 acres of land and immediately started clearing fields and building roads, labor camps, and houses for the staff (Figure 29) (Smith 1943).

Expenditures on the Nahiku Rubber Company facilities were soon augmented by the difficulties encountered by the early growers once planting had started (Figure 30). The first crop had been comprised of 50,000 rubber tree seeds imported from Brazil, some of the seeds germinated while the rest had failed to sprout. In the wake of these losses the company decided to scout the island for established trees already growing in people’s residences, and the company offered cash to acquire the domestic trees to their plantation. With the plantation being as remotely located as it was, the company would cut the trees down and transport the stumps to the fields for replanting,

which the managers viewed as a shortcut to bypass the long wait for seedlings to reach maturity (Figure 31). Very soon the capital for the project was expended, and the company began selling stock to raise more money for the plantations day to day costs of operation. Economic forecasts for the rubber industry did not live up to their expectations, and by the time that the Nahiku Rubber Company had a fully planted and matured 250 acres ready for tapping, the price of rubber had bottomed out at 16 cents per pound. Depending heavily on an all-inclusive low of one dollar per pound for their product, the domestic rubber market in Hawai'i could not remain profitable. The Nahiku Rubber Company, Ltd., managed by David Colville Lindsay at that time, was closed on January 20, 1915 (Siddall 1917:175).

#### 2.4.4.2.2 *Koolau Rubber Company*

In June of 1905, William A. McKay organized the Koolau Rubber Company at Nāhiku, and served as managing director during its first year of operation (Nellist 1925). By 1906, a year after the Koolau Rubber Company was founded, the prospects for the rubber plantation looked promising. A *Maui News* article from 1906 echoed this optimism by stating that “It is confidently expected that the growing of rubber will be one of the most successful industries on the island and will make possible the utilization of many acres of land that are now useless” (The Maui News 1906:13). The optimism was partly justified because upon return from an inspection of the plantation, the company representatives R. A. Wadsworth and W. L. Decoto reported a 15-foot growth of the previous year's crops that had been planted from seed. The luxuriant growth of the crop exceeded their expectations. The costs of cropping the rubber trees were also small for the time, costing the company only six dollars per acre to clear the dense vegetation and only about one cent per hole for planting saplings. At the time of this assessment, Koolau Rubber Company had only planted 25 acres of their 300-acre holdings and were expecting their next shipment of saplings later that year (The Maui News 1906).

By 1914, the Koolau Rubber Company had nearly its entire acreage planted and was poised to produce its maximum output, but the simultaneous fall of rubber prices on the world market forced the company into considerable financial hardship. Prices had dropped so drastically that the cost alone of tapping the trees on the plantation would have drained all the profit from the company's sales and would incur debt. The company had not been a profitable venture from the start and had been carried for some time by a small number of wealthy shareholders waiting patiently for the projected returns. In the end, rubber prices never rose to a profitable value for the Koolau Rubber Company and the prospect of severe economic atrophy had finally won out over the determination of the shareholders to keep the company in operation. In 1914, the Koolau Rubber Company published its notice of intention to foreclose on the \$30,000 dollar mortgage from the First National Bank of Wailuku and begin winding down operations immediately (Honolulu Star Bulletin 1914).

#### 2.4.4.2.3 *American-Hawaiian Rubber Company*

As early as 1906, the American-Hawaiian Rubber Company was in operation in East Maui with over 65,000 juvenile trees in the ground (The Hawaiian Star 1906c). In 1908, American Hawaiian Rubber Company fields were evaluated by F. T. P. Waterhouse who was particularly well pleased with the growth of the rubber trees. The hevea variety of rubber tree was the primary crop at this plantation with higher year to year yield being cited as the reason this species was



Figure 29. Nāhiku hillsides planted with rubber tree saplings; plantation manager's house visible on the ridge (Pacific Commercial Advertiser 1910)

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LRFI for Nāhiku, Ke'anae, Honomanū, and Huelo License Areas, Multiple Ahupua'a, Makawao and Hāna, Maui

TMKs: [2] 1-1 (various plats and parcels), 1-2-004:005, 007 (por.), and 2-9-014:(various parcels)





Figure 30. Seedlings being planted at the Nahiku Rubber Company (Pacific Commercial Advertiser 1910)





Figure 31. Nahiku Rubber Company Manager C. H. Anderson riding among his rubber tree saplings (The Honolulu Advertiser 1908)

chosen over the more commonly planted cerea tree. The company also experimented with castilloa rubber trees from Mexico and with interstitial planting of select food crops between the widely spaced rubber trees. The use of hevea trees was initially not as beneficial as had been anticipated by the American-Hawaiian Rubber Company. Initially, the hevea trees were planted during the winter months as the this was when the seed crops originating in the southern hemisphere were maturing and rife for shipment, the abundance of which made the cost of procurement less expensive. Even though the trees in the region were generally doing well, this error in planting times was cited as being the reason why timely maturation and first yields were lacking (The Honolulu Advertiser 1908). As with the neighboring plantations in the area, once the trees were planted and growing the enterprise became a waiting game until the trees were mature enough to harvest. An article in *The Honolulu Advertiser* (1910:13) relates the continued optimism as harvest approached:

The product is of prime quality, there is a keen demand for it as a result of samples sent out, and the price continues to rule high. Small wonder that the Nahiku rubber planters impatiently watch the growth of their trees and pray that the price of rubber may keep up. They have had a hard row to hoe, but have stuck manfully to their work...There seems to be no doubt as to the ultimate success of the rubber enterprise, which has been removed for beyond the experimental stage, as far as paying returns are concerned. (The Honolulu Advertiser 1910:13)

New techniques, cultivation of a variety of species, planting additional crops between rubber trees, and patience did not pan out for the American-Hawaiian Rubber Company, and in 1917 the company gave notice of foreclosure on their mortgage in local newspapers (Honolulu Star Bulletin 1917).

#### 2.4.4.2.4 *Nahiku Sugar Company*

Unlike other rubber ventures in the region, the Nahiku Sugar Company approached the planting of rubber with a bit more caution and tempered enthusiasm than their neighboring competitors. Whether this approach was resulting from the failure of the plantation to successfully crop sugar a decade earlier is uncertain, but by the time that the rubber industry had begun to grow in the region the Nahiku Sugar Company lands were in a severe state of neglect (The Hawaiian Star 1907). Sometime between late 1905 and early 1906, Alexander & Baldwin hired a new manager for the former sugar plantation at Nāhiku by the name of J Sylvester from Portland Maine (The Hawaiian Gazette 1908). By late 1907 Sylvester had planted nearly 100 acres in cerea rubber trees mimicking the other local plantations with a rough planting of about 400 individual trees per acre under cultivation (The Hawaiian Gazette 1907). Details about rubber crops specific to Nahiku Sugar Company regarding the product quality and progress of growth are scarce, but in general, their rubber crops seem to have lacked the same profitability as the neighboring plantations. By the time that the manager of the Nahiku Rubber Plantation, W. A. Anderson, brought a group of potential investors through the region to evaluate the state of rubber growth in East Maui, The Nahiku Sugar Company manager had decided that the next years plantings would not be as close together and that he would be experimenting with hevea variety trees in the next plantings (The Hawaiian Gazette 1908). The new planting techniques either came too late or were of little profit to the company as under two years after first planting a portion of their land to rubber the plantation manager announced that no more rubber would go into the ground until the already developing

downward trend in rubber's market value reached a more favorable standing (The Maui News 1907)

While rubber cultivation was in full swing, the plantation managers made it their business to regularly test the crop productivity to better gauge the long term financial viability and estimate future yields, especially W. A. Anderson who managed the Koolau Rubber Company and oversaw a government experimental station for the express purpose of evaluating the local rubber industry. Initial rubber tree tapping in 1912 yielded an "enormous quantity" of the valuable latex sap, and appeared to bode well for the profitability of the local plantations (The Maui News 1912:1). Although the sap was voluminous it was found to lack the elastic qualities that would have made it ideal for tire production, and instead the rubber produced in East Maui was only suitable for "machine belts and other articles which do not demand the elastic qualities" (The Maui News 1912:1). Just how profitable the non-elastic latex sales would be was unclear at the time of the published article, as the market for those goods was not in as much demand as the need for automobile tires.

Ultimately a decline in the price of rubber doomed the Maui rubber industry. After testing for several years, the rubber growers concluded that it would not be profitable to continue. It was found that the temperature was hardly warm enough for rubber to grow best and that labor was much more expensive than at Malaysian plantations (O. W. Freeman 1927:64).

#### 2.4.4.3 Ke'anae

Ke'anae is located on the windward flank of Mauna Haleakalā in the Hāna District and traditional *moku* of Ko'olau within the ahupua'a of Ke'anae. Once a site of intensified Native Hawaiian agriculture and habitation, and later becoming a center for missionary and agricultural activities during the 1800s, Ke'anae packed several hundred years of historical development into a single stream-fed coastal valley peninsula. Though the region experienced varying degrees of economic boom and bust over its storied history, that history would become the next major draw to the region and supply income to its residents where subsistence and industry fell short.

##### 2.4.4.3.1 Ke'anae Homesteads

Ke'anae has been an active agricultural community for many generations. Studies of the history of land use in Ke'anae indicate that the lands have been used intensively for wetland taro cultivation, or *lo'i* agriculture, historically and during pre-Contact times (Group 70 International et al. 1995:70; E. S. C. Handy et al. 1991). As Native Hawaiian populations of the islands declined with the arrival of western disease, so too did the need for taro, resulting in unattended *lo'i* in the Ke'anae area. In the second half of the nineteenth century, the market for rice grew significantly with increasing demand from Chinese laborers on sugar plantations in Hāna. After successfully completing labor contracts, Chinese immigrants looking for independent pursuits took advantage of an opportunity to grow their own staple, rice (Wright 1974b). With a pond field irrigation system already in place in Ke'anae, the region was ripe for conversion from taro cultivation to rice. Chinese entrepreneurs commonly leased former *lo'i* lands from Hawaiian owners for rice cultivation (Group 70 International et al. 1995). Tax records for 1890 indicate that the rice lands in Ke'anae and Wailuanui comprised approximately 67.84 acres out of a total of 163.322 acres in pond-field agriculture. Two years later, this number rose to 75 acres in Ke'anae and Wailuanui while other lands on Maui (Honokowai, Waikapu, Wailuku, Waiehu, and Waihe'e) registered a combined acreage of 175 (Group 70 International et al. 1995; Linnekin 1985).

The Chinese farming community flourished in Ke‘anae, and with an increase in population came the construction of buildings necessary for production and housing related to the rice plantations, as well as the establishment of socially-related organizations. An article in *The Hawaiian Star* (1906b) reports of two saloons “run by Chinamen”. The Li Hing Society Building (SIHP # 50-50-07-1510), a two-story wooden structure with a second story front porch, was built in 1908 and served as a place for Chinese social, religious, and educational purposes until the early 1950s (Figure 32) (Wright 1974b). After falling into disuse, the building was subject to repeated vandalism until, in 1981, it was demolished (Group 70 International et al. 1995). Remnants are now stored at the Kwock Hing Society in Keokea, Kula (Wright 1974b).

In 1906, 14 applications were received out of the 16 Ke‘anae homestead applications made available at that time to Hawaiians. Stipulations required occupants to build a residence and cultivate taro on the homestead parcels, which each averaged about two to three acres including from a half to a whole acre of taro land (*The Hawaiian Star* 1906a). Concerns regarding these homesteads were reported:

It is very probable that many of the applicants do not realize, or have not taken the time to consider the conditions under which the land is to be awarded to them, but fully expect to lease out their land to the Chinese there for planting rice, and let their kula land lie idle, and when the first two years are up a great many of them will doubtless forfeit their lots. The Hawaiians there have been asking for homestead for several years back and it is now up to them to make good. (*The Hawaiian Star* 1906a:5)

Hawaiians did grow taro on these early homesteads, mostly for home consumption. Rice farming declined sharply following 1910, and by 1935 ceased entirely (Group 70 International et al. 1995). Around 1920 many Hawaiians returned and began commercially cultivating taro on Ke‘anae Homesteads (Figure 33). Due to its important cultural and historical significance, the Ke‘anae Peninsula taro complex has been designated SIHP # 50-50-07-3933.

#### 2.4.4.3.2 *Transportation Infrastructure*

Prior to the construction of the Belt Road to Hāna, horse trails, developed when engineers constructed aqueduct systems between East Maui and the central Maui isthmus, were the only means of overland travel. Travelers leaving Ha‘ikū on horseback for Ke‘anae descended and ascended 22 major valleys before arriving at Ke‘anae. Along the way, the traveler would have visited Native Hawaiian villages at Huelo, Kolia, Waiakamoi, Wahinepe‘e, Puahokamoa and Honomanū. Inter-island steamships made regular stops at the Ke‘anae Landing, but were considered expensive (\$2.00 for deck passage) (*The Maui News* 1926).

Reports of an exceptional account of a Chinese merchant departing from Ke‘anae Landing to ship rice to Makawao was published in *The Honolulu Republican* (1901:9) newspapers:

On account of the refusal of the Wilder Steamship Co. to carry rice from Keanae to Maliko, T. Awana, one of the most enterprising Chinese in the Islands, has contrived another means by which he can convey his rice to Maliko, and from there to Makawao in carta. Awana has built a Chinese sampan, and rigged it with Chinese sails. The boat was built at Maliko of white pine, and it can carry about five tons of merchandise. It is manned by a crew of about ten Chinamen, whom Awana has





Figure 32. Historic Rice Mill (SIHP # 50-50-07-1510) in the Ke‘anae Historic District (The Honolulu Advertiser 1910)



Figure 33. Portraits of Ke‘anae homesteaders and their residences (The Honolulu Advertiser 1910:13)

selected from his number of workmen. These Chinese at first were not accustomed to the motion of the boat, and on this account it took some time before the boat reached Maliko from Keanae with its first load of five tons of rice. From Maliko the boat leaves for Keanae with small loads of food-stuff to supply Awana's customers on the other side. Awana owns large patches of rice in the Keanae District. All the riggings and gear for the sampan were made by Awana, even the rope which he uses to fasten the sampan to its moorings in Maliko. Mr. Awana also grinds his own coffee for sale in his store at Makawao, keeps cattle, and engages in several other enterprises, all of which he attends to personally. The rice which reaches Maliko from Keanae is carried to his store at Makawao in ox carts, where it is sold in large quantities (Honolulu Republican 1901:9)

An article in *The Honolulu Advertiser* (1901a:11) further describes the crew and trip:

...The crew consisted of ten sailors six Chinese and four Hawaiians. The trip over was a rough one, the six Chinese being sick from the motion of the waves not to mention the effort of rowing in a choppy sea. As the wind was contrary, the sampan had to be rowed over, eight oarsmen working at one time. They sailed back again in three hours with the assistance of one of their two square sails. Five tons of rice was the cargo brought from Keanae. The start was made on the 28<sup>th</sup> and the return during the 30<sup>th</sup>. (Honolulu Advertiser 1901a)

After 1927, use of the landing had discontinued. In 1992, remnants of Ke'anae Landing were assigned SIHP # 50-50-07-2957 (Group 70 International et al. 1995).

In 1912, a narrow road and bridges were completed that connected Kailua to Nuaailua Bay near Ke'anae, and by 1915, other contractors had built a road connecting Hāna to Ke'anae. However, this Hāna connection ended in the Ko'olua forest instead of tying into the road to Kailua (Group 70 International et al. 1995). Two historic concrete tee beam bridges were constructed near the entrance of Ke'anae Peninsula in 1916, Piinaau Stream Bridge and Palauhulu Stream Bridge (Group 70 International et al. 1995).

By 1922, the Hāna Belt Road had been completed between Kuiaha and Kakipi Gulch. In 1923, the County Board of Supervisors requested more prison labor for roadwork between Kailua and Ke'anae. While road work continued toward Ke'anae, survey work commenced between Ke'anae and Kopili'ula. In June 1925, the grand opening of the Kailua-to-Ke'anae portion of the Belt Road was celebrated by a procession of automobiles to Ke'anae. Territorial Governor Wallace Farrington dedicated the opening of the road with County Board of Supervisors Chairman Samuel Kalama and others (Figure 34) (The Maui News 1926). A highly anticipated *luau* was held on Kamehameha Day to celebrate the opening of Hāna Belt Road into Ke'anae:

The celebration will be the first time that the Keanae folk as a community have been brought into direct contact with those of the rest of the island, and all the district is determined to make the affair a rousing success. Hawaiian delicacies in fish and fruit are promised in lavish supply from the Hana and Keanae country, and June 11 has been written down a day of ill omen for the pigs and steers of Central Maui." (Honolulu Star Bulletin 1925:21)



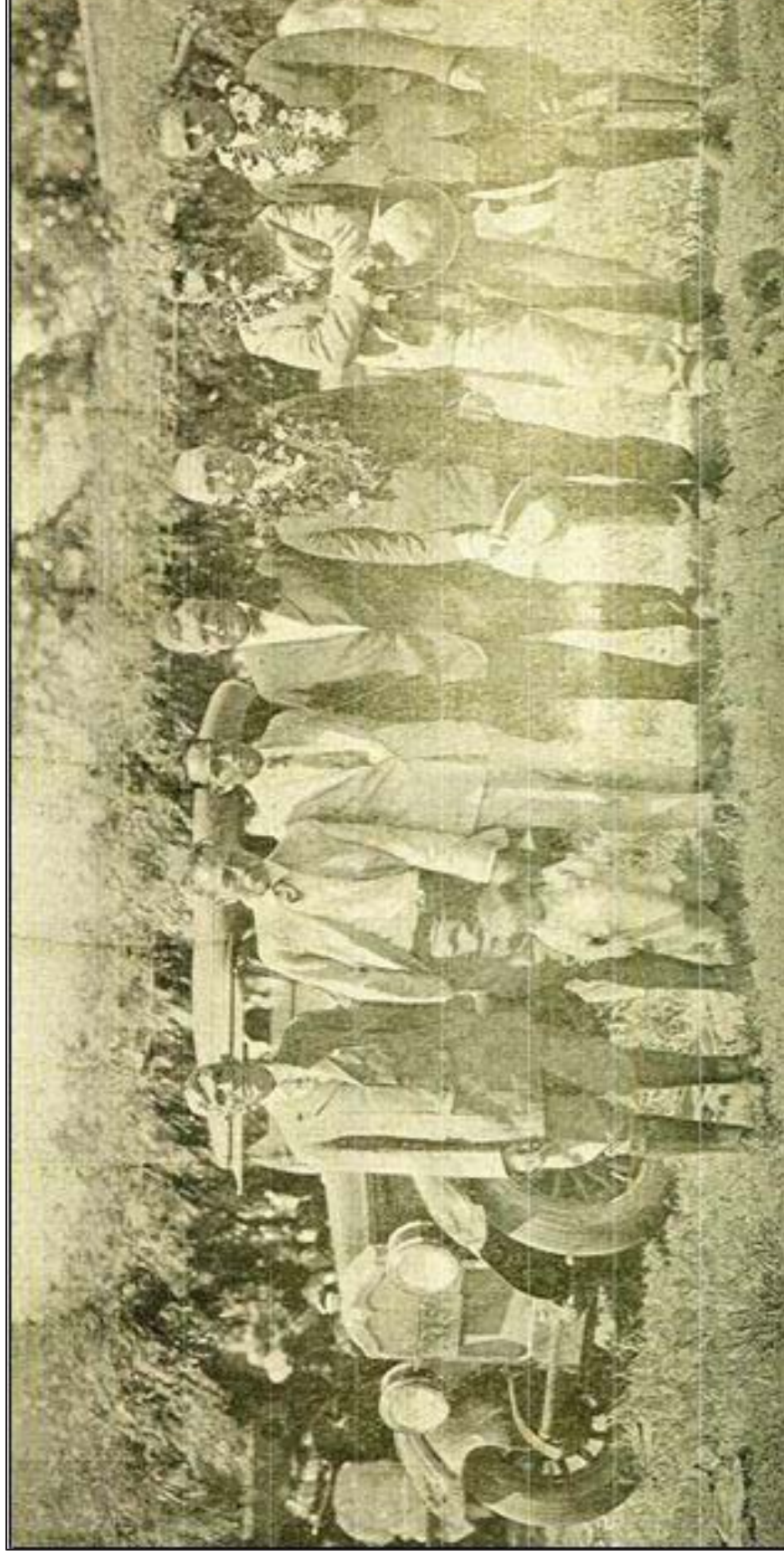


Figure 34. A group of Maui County Supervisors pose with Governor Farrington in Ke'anae. Left to right: R.A. Drummond, W.F. Kaae, County Engineer P. Low, Sheriff C. Crowell, Governor W. Farrington, Chairman S. Kalama and D.T. Fleming (The Maui News 1926)



#### 2.4.4.3.3 Churches

The Ke'anae Protestant Church (SIHP # 50-50-07-1511), also referred to as Ke'anae Congregational Church or Ke'anae Church (Figure 35), is a stone structure with wooden doors and a single interior open space located near the ocean on the Ke'anae Peninsula. A small cemetery adjoins the north side of the church. While materials were being gathered as early as 1857, the church was not built and dedicated until 1860 (Group 70 International et al. 1995). Construction was not entirely completed until 1863. Painted on the east wall behind the pulpit is the church's given name, "Lanakila Ihiihi O Iehova Ona Kaua," meaning "Sacredness, Success of Jehova, the Son of God" (Wright 1974a).

The surveyor responsible for completing the NRHP form for Ke'anae Church, J. C. Wright (1974a:3), further describes the Ke'anae Church as an "excellent example of the early stone mission church erected in distant outposts with indigenous materials." This large structure, which included an attached social hall, not only served the congregational needs of the local Ke'anae inhabitants, but also provided a gathering place for surrounding communities (Wright 1974a).

On 1 April 1946, a *tsunami* generated by an earthquake in the Aleutian Islands off the coast of Alaska, struck the Ke'anae Peninsula. The height of the *tsunami* runup over two separate spots at Wailua was measured at 4.8 m (15.7 ft) and at 5.1 m (16.7 ft) (World Data Center 1977). The Keanae Church was the only structure left standing when the *tsunami* receded (Bartholomew and Bailey 1994), although the assembly hall was destroyed (Group 70 International et al. 1995). The church sustained some damage from the 1946 *tsunami*, and by 1968, time had weathered the structure to a point of having a leaky roof, a near collapsing ceiling, and a saggy floor (Wright 1974a).

Mr. Harry K. Pahukoa, Jr., and his mother, Mrs. Nary Aima Pahukoa, with the assistance of the other four families of the church and a carpenter friend, began repairs on the church. Though slow at first, help from the community did materialize. Funds and chandeliers were donated, and volunteers helped refinish pews, paint the walls, and install electricity. The roof, windows, doors, and floors were all repaired. Through diligence, faith, and dedication, the Pahukoa's dreams of repairing the church were realized, and their efforts have helped secure this historic site for posterity. More than 350 people attended the rededication of Ke'anae Church on July 27, 1969 (Wright 1974a). In addition to Ke'anae Protestant Church, another historic church is also present in Ke'anae. Wailua Mormon Church (SIHP # 50-50-07-1514) is a one-story wooden building situated between Ke'anae School and Wailua Homesteads Road. It was built in 1934 and dedicated in 1935. It served a small Mormon community in the Ke'anae area before it was eventually abandoned and used mostly as a residence. In 1974, the church had only five members (Wright 1974a).

#### 2.4.4.3.4 Ke'anae School

The first school in Ke'anae was located on the peninsula near the Ke'anae Congregational Church. The main portion of the present day Ke'anae School was built in 1912 with subsequent additions. The school provided a common learning place for children in kindergarten through eighth grade, in which the older students commonly assisted the younger pupils (Lum 1969). Initial enrollment was for 63 students (Penkiunas 1992). This number fluctuated throughout the years, but the curriculum continued to include traditional Hawaiian values and practices, including

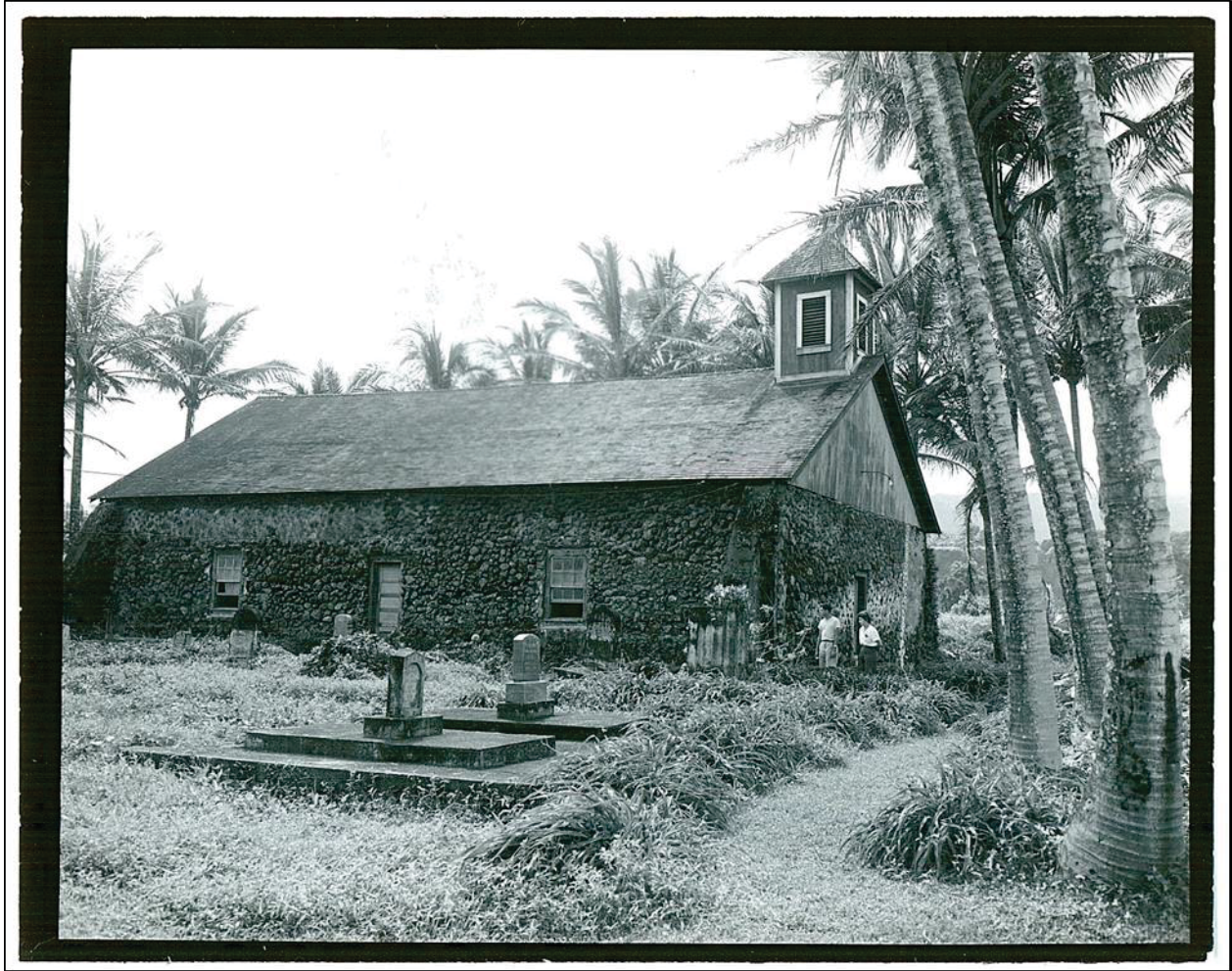


Figure 35. 1958 Photo of Ke'anae Protestant Church (CSH Archives).

Hawaiian language and the cultivation of and traditional uses for plants (Figure 36 and Figure 37) (Tanji 1978). According to the Penkiunas (1992:10), Keanae School is a “surviving example of a small rural school” that “represents the small wooden vernacular building found in many rural areas” and is the “last remaining two-room schoolhouse on Maui” (Figure 38) (Penkiunas 1992:10). It has been designated SIHP # 50-50-07-1630. After much debate regarding the school’s closure, the last class was held at Ke‘anae School in 2005. It was officially closed in 2010 (The Honolulu Advertiser 2010).

#### 2.4.4.3.5 YMCA Camp Complex, Ke‘anae Arboretum, and Ke‘anae Quarry

The Ke‘anae Prison camp was used from about 1925 to 1939. In the 1920s, prisoners at the camp worked on the construction of the Hāna Belt Road. The prison camp was converted to a Civilian Conservation Corps (CCC) camp in 1934, where islanders were employed to plant thousands of eucalyptus and other tree species, such as *koa* and *wauke* in the region. In 1946, the camp again housed prisoners who renovated the *lo‘i* located at the nearby Ke‘anae Arboretum. The Ke‘anae Arboretum *lo‘i* complex (SIHP # 50-50-07-3922) consists of 14 *lo‘i* on two to three acres west of Piinaau. These *lo‘i* have existed much longer than the arboretum, which was started in 1942 but did not open to the public until around 1970. The prison camp was closed in 1950. YMCA received a lease for the camp in 1949. Today the site is a YMCA camp that can be rented by the public. The YMCA camp complex consists of a group of plantation style wooden buildings. The manager’s residence, constructed in 1934, is the oldest building in the complex. The YMCA camp site offers panoramic views above Ke‘anae Peninsula and overlooks Ke‘anae Landing and Ke‘anae Quarry (Group 70 International et al. 1995).

Keanae Quarry (SIHP # 50-50-07-3943) is located on a hill beneath the YMCA camp. It was used during the 1920s by prisoners who helped build the Hāna Belt Road with the blue rock that was crushed at the quarry. Features encountered at the quarry indicate the site was also used during World War II (WWII). When the quarry was first documented by Group 70 International et al. (1995), old machinery, a WWII gun emplacement, and a rock platform were observed. The platform may be the grave site of a former worker who died during a blasting accident.

Today, Ke‘anae consists of taro fields, small residential areas, and parks. In addition to taro, residents now also grow bananas, yams, and other wetland crops (James 2002). Though the landscape has undergone some changes, Ke‘anae, with its *lo‘i* and preserved historic infrastructure, offers a glimpse into the traditional and historic land use in East Maui.



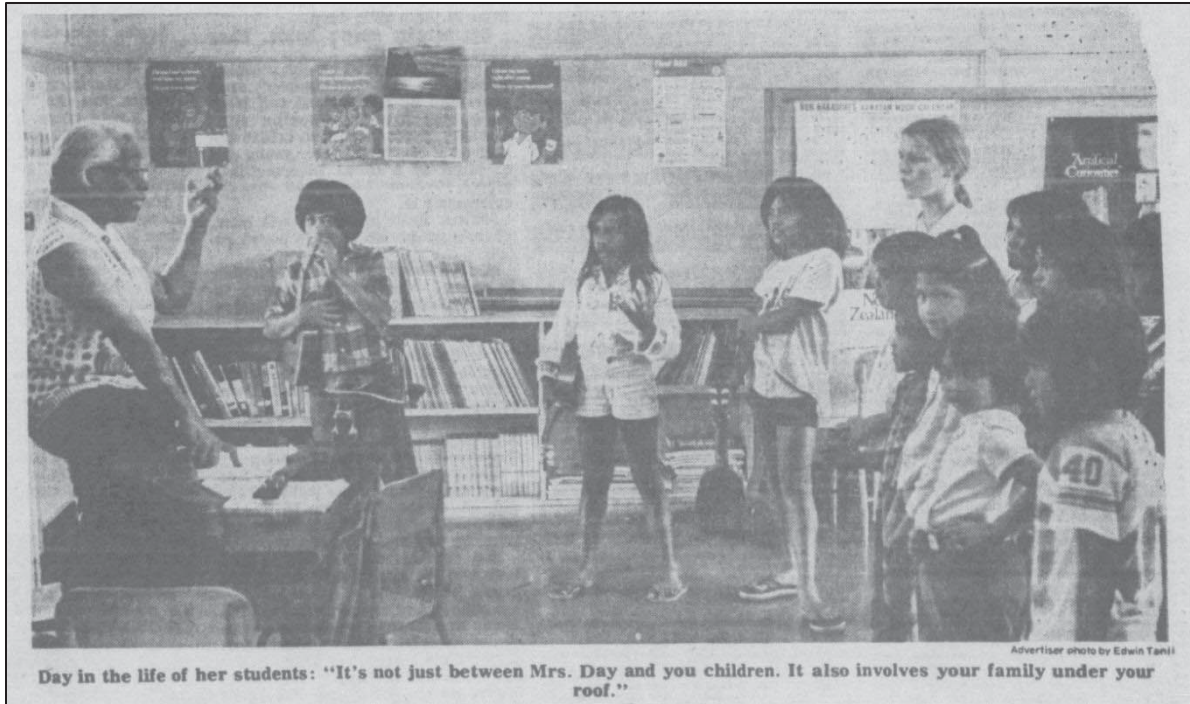


Figure 36. Mrs. Apolonia Day teaching her students at Ke‘anae School in 1978 (Honolulu Advertiser 1978)



Figure 37 Ke‘anae School students playing football (Honolulu Star Bulletin 1969)





Figure 38. 2013 Photograph of Ke'anae School (Wikimedia 2016)

#### 2.4.4.4 Hāna Highway Historic District

The Hāna Highway Historic District (SIHP # 50-50-va-1638), which includes 48 miles of roadway beginning at 0.2 miles west of Mile Marker 3 on State Route 360 (Hāna Highway) and ending at Kalepa Gulch on County Route 31 (Pi'ilani Highway), includes 78 contributing feature components. The Hāna Highway was also recognized as a Millennium Legacy Trail in 2000, and in 2001 was nominated to the National Register of Historic Places (NRHP). A total of 73 contributing resources of the Hāna Highway Historic District were documented within the district's NRHP registration form (Duensing 2001). A Historic American Engineering Record (HAER) No. HI-75 for the Hāna Belt Road was published by the National Park Service in 2005 to provide descriptions of the historic architectural and engineering features of the Hāna Historic District (Duensing 2005). Of the 78 component features of the Historic District approximately 56 of the bridges/culverts exist between Hāna and the central isthmus of Maui along the north shore of the island (Figure 39).

Portions of the road corridor are much older than the existing historic highway. It has predecessors as early as the time of the Maui King Pi'ilani's Alaloa ("long road") and Kihapi'ilani's addition to the Alaloa known as "The Kings Trail" in the 1600s, to the time of the "Ditch Trail" that ran alongside the early water catchment and diversion ditches for agriculture in the early 1900s. The Hāna Highway was first built with the intent to circumscribe East Maui with a levelled road surface in 1900, complete with gulch spanning bridges. The initial roadwork of the early twentieth century was piecemeal and incremental at best, sometimes making use of horse and foot trails connecting otherwise isolated sections of road (Duensing 2005). Dawn E. Duensing in Hāna Belt Road HAER HI-75 (2005:29) describes the difficulty of working on the early road as follows:

The work required in the Hana District was quite extensive due to the heavy rainstorms and freshets. At times flooding during the winter rainy season made it impossible to travel on the Hana Road...mail carriers were unable to complete their rounds, so the SPW [Superintendent of Public Works] ordered foot bridges built over deep gulches. Travelers were stuck with difficult overland travel on horseback or by steamers, which used what one resident called the "most impractical landings." (Duensing 2005:29)

Many of these problems were alleviated with the passing of the County Act of 1905 that established county government throughout the State of Hawai'i, an important function of which was to appoint a county engineer by the name of Hugh Howell to oversee civic projects like the Hāna Belt Road. Replacement of the bridges was of utmost importance to the Hāna Belt Road project since "many of the [existing] bridges had deteriorated from rot and had trusses that were considered dangerous" (Duensing 2005:30). Howell's program of replacing the truss type bridges with concrete pier-type bridges was first implemented across 'Ohe'o Gulch amounting to a seventy foot span. Although construction of these new type of bridge foundations were expensive, Howell argued that it represented an economic reconstruction since concrete piers required less maintenance than the trusses, which reduced necessary maintenance cost from an estimated \$50 per year to \$5 per year. Part of these savings in maintenance also originated in Howells use of crude oil and carbolineum to help protect the wooden superstructure against the moist tropical air and environment (Duensing 2005).

Construction of the road was slow for several years as the existing funding for the project was extremely limited and insufficient, having originated at that time from small amounts of money parceled out yearly by the government for the completion of consecutive sections of the road. This financial difficulty combined with the physical difficulty of building the road had the project approximately 10 years behind schedule by 1909. The formation of the Maui Loan Fund Commission (MLFC) in 1911 enabled the project to move forward with a more permanent capital improvement by replacing all timber bridges with concrete. The formation of the MLFC and the regularity of funding it provided enabled the construction of the first several concrete bridges enumerated among the Hāna Highway Historic District. The bridges constructed during the initial implementation of this funding were those named: Waikomai, Kolea, Honomanū, Nua‘ailua, Mo‘omonui, Waiakoi, Pa‘ihi, South Wailua (Honolewa), and Koukou‘ai (Duensing 2005).

By 1920, the project saw the completion of many additional concrete bridges to the belt road, however the belt road itself was far from complete as it still did not connect at several points. Also during 1920, the MLFC decided that it would suspend funding for the Hāna Belt Road for a few years to allocate funds to roads nearer the central isthmus that were seasonally inhibiting pineapple harvests due to poor conditions. The suspension of the belt road project would last until 1923 when Maui’s business and civic leaders, along with the Hawai‘i governor Wallace Farrington, became proponents of a resurgence of civic interest in the project. This revitalized interest fueled a massive organized effort to complete the section of the road from Kailua to Ke‘anae, which was completed by its projected finish date in 1925 (Duensing 2005).

The construction of the next section of the Hāna Belt Road was begun shortly after the completion of the Kailua to Ke‘anae section, and was boosted by a substantial bond from President Calvin Coolidge issued to the Territory of Hawai‘i that included \$150,000 for completion of the proposed 3.5 mile stretch from Ke‘anae to Wailuaiki. This stretch would prove to be the most difficult portion of road to create due to the many serried ridges of hard volcanic stone that had to be blasted through, and because of the occasional slipping of steam shovels into deep gorges and mechanical issues associated with their employment in the process of rock breaking. Occasional flooding and landslides were also a discouraging element of constructing the belt road, having been responsible for several instances of burying the steam shovels under their downslope aftermath. The final stretch of road was completed with the construction of Wailuanui Bridge in 1926, which had itself been setback by a landslide that sent 600 bags of concrete needed for its construction coursing down the adjacent gulch and out to sea (Duensing 2005).

The Hāna Belt Road was completed and opened to the public in 1926 and effectively ended Hāna District’s centuries of geographic isolation from the rest of the island. Although the public had begun travelling the road, several bridges were operational but incomplete. All the original bridges that comprise the historic road were not completed until 1947, and the road itself lacked a complete pavement up until the 1960s (Duensing 2005).

The types of component structures of the historic district consist of bridges and culverts, including: masonry arch bridges (Figure 40), concrete bridges (Figure 41), concrete arch bridges, and stone and concrete culverts. Since the road had been scarcely maintained since the final paving of the surface in 1962, it had been ravaged by the passing of time, showing few contemporary improvements aside from the addition of guardrails and pavement patch on the road surface.

In the 1990s the State of Hawai'i responded to the need to repair the Hāna Belt Road and implemented a preservation plan for the entire length of state-owned road between Huelo and Hāna. The preservation plan called not just for the preservation of the bridges themselves, but instead sought to retain the “character” of the road with its narrow bridges and winding cliffside roads. This proved to be a challenge as the funds offered by the Federal Highway Administration (FHWA) required the roads to be widened to their standard widths of 36 feet, with some of the existing roads only being about 16 feet wide. Ultimately the historic width of the bridges was allowed to remain narrow (Figure 42), conditional upon approval by the FHWA on a case by case basis. As a result of this ongoing maintenance work, the historic district has been thoroughly researched and described in detail by multiple studies (Duensing 2001, 2005; McCurdy et al. 2014; MKE Associates LLC and Fung Associates 2013; Nagamine Okawa Engineers Inc. and Fung Associates 2015; Oceanit 2000; Wilson Okamoto & Associates 2001)

Ultimately the Hāna Belt Road was deemed a historic property of significance due to the efforts and achievements surrounding its construction. Duensing (2005:55-56) clarifies the roads effect on the region:

The Hana Belt Road was a substantial public works achievement...during an era when Maui, especially Hana, was quite isolated from the rest of the world... the Hana Belt Road also involved the expertise of highly trained engineers and designers... Although some of the construction work was contracted out, county employees did nearly all the design and engineering work. (Duensing 2005:55-56)

Although the Hāna Belt Road was constructed to more sufficiently connect and develop the remote eastern side of the island, the opposite effect has been documented because of the narrow winding nature of the historic highway. Duensing (2005:59) clearly illustrates this point as follows:

The lack of easily-travelled, high-speed traffic artery has served to impede substantial development...There are no fast food chain restaurants, chain stores, strip malls or sprawling subdivisions along the Hana Belt Road. Travelers...are served by the occasional roadside stand and must drive all the way to Hana for limited conveniences such as groceries, gas, and restaurants. With a sizeable population of residents of Hawaiian ancestry, Hana is often cited as Maui's “most Hawaiian community” (Duensing 2005:59)

The novel architectural features of an early twentieth century road combined with an awe inspiring slow drive through densely vegetated jungle and deep gulches have afforded the Hāna Belt Road a character uncommon in most civic projects of the early twentieth century.



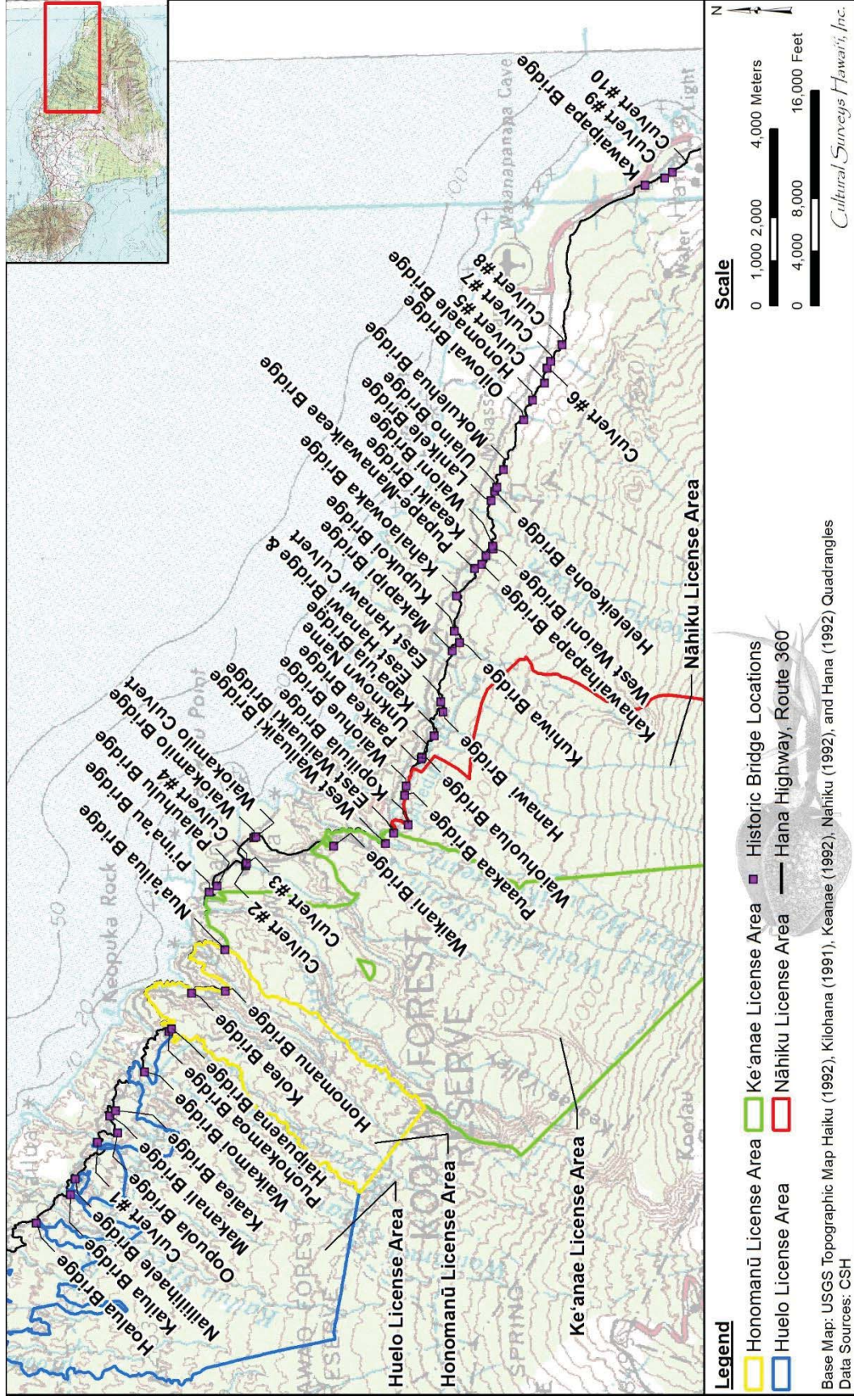


Figure 39. Portion of the Haiku (1992a), Kilohana (1991), Keanae (U.S. Geological Survey 1992c) USGS topographic quadrangles depicting historic bridge locations in East Maui

LRFI for Nahiku, Ke'anae, Honomanu, and Huelo License Areas, Multiple Ahupua'a, Makawao and Hana, Maui

TMKS: [2] 1-1 (various plats and parcels), 1-2-004-005, 007 (por.), and 2-9-014:(various parcels)





Figure 40. Hāhālawe Bridge, a characteristic masonry arch style bridge (Wilson Okamoto & Associates 2001)



Figure 41. Papahawahawa Stream Bridge, a concrete beam and slab style bridge (Wilson Okamoto & Associates 2001)



Figure 42. Hāna Belt Road near Waiele Bridge, illustrating the narrow roadway tightly encroached upon by bedrock ridges and jungle vegetation (Wilson Okamoto & Associates 2001)



### 2.4.5 Modern Land Use

When the sugar industry in the Hawaiian Islands began to decline, tourism emerged as one of the largest economic sectors across the state. Prior to the 1970s, the region of East Maui remained a collection of communities isolated by a 50-mile-long road legendary for its twisting turns and landslides. Recent improvements to the bridges and roads now allow over 700,000 visitors yearly to tour East Maui (Wood 2003). Tourism through East Maui was augmented by the burial of Charles Lindberg at Kīpahulu in 1974 at the Palapala Ho'omau Congregational Church graveyard, and has since continued at an ever-increasing pace, with the purchase of large tracts of land in Hāna by celebrities such as Steven Tyler, George Harrison, Jim Nabors, Kris Kristofferson, and Oprah Winfrey.

After leaving Pā'ia and Ha'ikū toward the east, the Hāna Highway crosses the Huelo region and enters the beginning of the rain belt that feeds the dense north-shore jungles of East Maui. In addition to containing many small groupings of isolated residences, the Huelo region has many points of environmental interest. Chief among these is the popular Twin Falls Fruit Stand that contains many gardens of edible flora and a network of trails leading visitors through the forest to small pools and the waterfalls that feed them. The Huelo region also offers many hiking trails (including the Bamboo Forest trails), Huelo Point Lookout, Jungle Zipline, and several smaller lodgings and eco-retreats. Kaulanapueo Church, built in 1853, is among one of the more prominent historic features of the area. These attractions are in addition to the numerous small beaches and waterfalls that can be observed proximate to the Highway, in addition to the residence of American singer/songwriter Steven Tyler.

As the Hāna highway passes through the Ke'anae region it skirts the edge of the large Ko'olau Forest Reserve that spans the highlands between Huelo and Hāna. The Ko'olau Forest Reserve, Hāna Forest Reserve, Haleakalā National Park, and Kīpahulu Forest Reserve form a continuous band of adjoined conservation lands that comprise a significant portion of East Maui. The conservation lands of Ko'olau and Hāna, spanning the entire northeast portion of East Maui, also make a significant portion of their land holdings available as a game reserve for licensed hunters (State of Hawaii 2015a, b). In these lands, hunters are allowed to hunt feral pigs and goats by means of rifle, handgun, shotgun, archery, and dogs year round with limited vehicle access (State of Hawaii 2018). These conservation lands also contain a number of smaller hiking trails into the tropical hinterlands of East Maui, as well as Pua'a Ka'a State Wayside Park, Wailua Valley State Wayside Park, Honomanu Park, Kaumahina State Wayside Park, Ke'anae Valley Lookout Park, Waikamoi Nature Trailhead, Garden of Eden Arboretum, and Ke'anae Arboretum. This stretch of Hāna Highway also crosses the historic regions of Ke'anae Peninsula, Ke'anae Valley, Honomanū Valley, and Nāhiku that are home to small rural communities and various small roadside shops and food/fruit stands that service weary travelers seeking a respite from the winding roads. Another notable visitor attraction on this stretch of the Hāna Highway is the Saint Gabriels Mission Coral Miracle Church built in 1860 out of locally sourced stone and coral mortar (Hana Picnic Lunch Co. 2018).

The Nāhiku region of East Maui, located east of Ke'anae, houses a small community separated from other residential areas by dense forests on its east and west flanks. Attractions for the traveler in this area include the Nahiku Viewpoint and Wayside Park, the Nahiku Church, and the private estate of the late George Harrison of the early rock group The Beatles (Google Maps 2018; Yucha



and Hammatt 2017). The community in this region consists largely of multi-generational family homes connected by a single lane road that winds alongside the residences down to the coast.

The scenic city of Hāna in East Maui has been known for some time as a place left aside by the vagaries of commercial development that has changed the cultural landscape of distant towns such as Lahaina and Kīhei. Many travelers to the island seek to visit the Hāna coast for a view of the “Real Hawaii” that has since lapsed in the towns and cities of the busier central and western portions of the island (Hawaii Web Group 2017). Visitors soon discover that beyond the road to Hāna, with its beautiful vistas and lush forests punctuated by streaming waterfalls, there are not many activities or amenities commonly available to them in resort areas. Hāna town today is marked by an abundance of domestic residences, relatively uncrowded beaches, hiking trails, campgrounds, cultural attractions and festivals, historic sites, and offers a host of guided tours to visitors. Hāna Town contains its own fire station, county council office, community center, three churches, two general stores, and a single gas station serving the residents. Domestic amenities aside, there are also two smaller inns, the slightly larger Travaasa Hotel (with its plantation style accommodations and pool/spa), the Luana Spa Retreat, Hāna Treasures gift shop, and a small host of restaurants and food trucks largely servicing the visitors who find their way out to this remote town. A noteworthy addition is the residence of singer/songwriter/actor/rogue scholar Kris Kristofferson just within the south side of Hāna town on a sizable piece of property off the main Highway (Real Geeks 2013). American TV icon, Jim Nabors also used to have a few hundred acres of macadamia nut fields in the region, before selling the land to the National Tropical Botanical Garden in 2002 (Pignataro 2017). Hāna is also home to the Hāna Ranch and the famous lava-stone constructed Fagan’s Cross, erected by Paul Fagan on the Ranch lands he had purchased in the 1940s (Hawaii Web Group 2017).

Hāna hosts a collection of tours that appeal to the naturalist, those interested in Hawaiian culture and history, and for those just seeking an afternoon of natural beauty. This sector is perhaps the largest economic draw to the region. In addition to being allowed to take rented vehicles down the scenic 50 mile Hāna Highway over historic bridges and through state park recreation areas, there are also five major providers of Road and Air tours of the region (TripAdvisor LLC 2018). Most of these tours take a few hours (by air) to a whole day (by road) and shuttle visitors to a variety of local attractions of the region such as various volcanic and coral sand beaches, Ka’eleku cavern lava tubes, Haleakalā National Park hiking trails and campground, Wainapanapa State Park and campground, Ono organic farm, local farmers markets, snorkeling reefs, various art galleries, and Hāna museum and cultural center among many smaller attractions.

Being one of the remote vestiges of old Hawaii, Hāna offers much in the way of cultural and historic activities for those interested in the Hawaiian culture. Most notable is the Hāna Cultural Center and Museum that houses a variety of physical artifacts and photographic displays of the history of the town. The Cultural Center also has on its grounds the federally recognized monument of the Historic Hāna Courthouse in addition to a replica of a traditional pre-Contact chiefly residence named Kauhale Village (Hana Cultural Center and Museum 2017). Another notable site is the Kahanu Garden which is part of the National Tropical Botanical Garden, a Hawaii based non-profit institution. In addition to housing a large pandanus forest among other plants of ethnobotanical significance to the Hawaiian People, the grounds also contain one of the largest ceremonial *heiau* in the state, Piilanihale Heiau. Additionally one can see the fortress hill of Ka’uiki on the coast of Hāna town, the site of a historic battles between Maui and Big Island chiefs

prior to Western contact and the birthplace of Queen Ka‘ahumanu, a notable figure in the Hawaii’s transition to modernity following Western contact (Hawaii Web Group 2017; Sterling 1998). The Hāna Taro Festival is also a notable attraction to visitors to the region. The festival, held annually between the spring months of March and May, displays many aspects of Hawaiian culture both past and present including traditional arts and crafts, live poi pounding, hula performances, Hawaiian music, farmer’s market, and food and drink booths.

## 2.5 Previous Archaeological Research

### 2.5.1 Early Maui Island Surveys

The earliest archaeological studies on the island of Maui were a part of island-wide surveys conducted in the early 1900s (Stokes 1916; Thrum 1909b; Walker 1931). These studies tended to focus on the compiling of descriptive lists of large-scale architecture or traditional ceremonial *heiau* sites. The *heiau* sites in the vicinity of the current License Area have been described in the context of the historic background of East Maui (see section 2.3.5. Heiau).

Between 1931 and 1976, only sporadic archaeological studies were undertaken in the area. Following the passage of the National Historic Preservation Act in 1966 and HRS Chapter 6E, which established the Historic Preservation Program in 1976, archaeological studies occurred as a condition of development on a more frequent basis. In this vein, the lands surrounding the current project area have been subject to a variety of studies including archaeological assessments, reconnaissance surveys, field inspections, AIS investigations), archaeological literature reviews and field inspections (LFRI), monitoring, cultural landscape studies, and preservation plans. The previous studies conducted within and around the current License Area are described in the following subsections.

### 2.5.2 Hāna Highway Archaeological Studies

The previous archaeological studies conducted for the Hāna Highway Historic District area summarized in Table 8 and depicted extending throughout multiple license areas.

#### 2.5.2.1 S. D. M. Freeman et al. (2004)

Between June and August 2004, CSH completed archaeological monitoring for the Hāna Highway Improvements Huelo to Hāna Project at mileposts (MPs) 4.2, 19.1, and 23.7 (TMKs: [2] 2-1-001; 2-1-002; 2-1-004:001–005; 2-2-009:005, 006, 009, 010, 012, and 013) (S. D. M. Freeman et al. 2004). No historic properties were identified.

#### 2.5.2.2 McCurdy et al. (2014)

Between 12 July and 15 August 2013, CSH completed the fieldwork component of a literature review and field inspection report for the proposed Hāna Highway Improvements, Huelo to Hāna Phase II Project (McCurdy et al. 2014). Eleven areas were investigated during the field inspection (pedestrian survey), including MPs 8.1, 11.2, 13.0, 14.7, 14.9, 15.7, 16.3, 17.7, 19.0, and 21.5 (TMKs: [2] 1-1-001:999; 1-1-002:999; 1-1-007:999; 1-1-008:999; and 1-2-001:999 por). Five additional contributing features of the Hāna Highway Historic District (SIHP # 50-50-07-1638) were identified and documented. These features, likely components of Hāna Highway construction ca. 1923, include an example of the cut and fill method employed during the construction of the Hāna Belt Road (Feature MP 8.1), five concrete guide posts (Feature MP 8.2), a retaining wall and culvert (Feature MP 15.7), a retaining wall (Feature MP 17.7), and a rock culvert and headwall (Feature 21.5).

Table 8. Previous Archaeological Studies within Hāna Highway Historic District

Reference	Type of Study	Location	Results
S. D. M. Freeman et al. (2004)	Archaeological monitoring	Hāna Highway mileposts 4.2, 19.1, and 23.7	No significant findings
McCurdy et al. (2014)	LRFI	Eleven areas along the Hāna Highway from Huelo to Hāna, including MPs 8.1, 11.2, 13.0, 14.7, 14.9, 15.7, 16.3, 17.7, 19.0, and 21.5	Identified and assigned temporary feature designations to five additional features of the Hāna Highway Historic District (SIHP # 50-50-07-1638), including an example of the cut and fill method employed during the construction of the Hāna Belt Road (Feature MP 8.1), five concrete guide posts (Feature MP 8.2), a retaining wall and culvert (Feature MP 15.7), a retaining wall (Feature MP 17.7), and a rock culvert and headwall (Feature 21.5)
Madeus and Hammatt (2017)	Archaeological monitoring	Hāna Highway MPs 10.4, 14.0, and 16.0	No significant findings



### 2.5.2.3 Madeus and Hammatt (2017)

Between 23 July and 31 October 2012, CSH monitored ground disturbing activities associated with Hāna Highway emergency road repairs at MPs 10.4, 14.0, and 16.0 (TMKs: [2] 1-1-001:022, 023 por., 044, 999 por. and 1-1-002:002, 012 por.) (Madeus and Hammatt 2017). No historic properties were identified.

## 2.5.3 Huelo License Area Archaeological Studies

Previous archaeological studies conducted within or near the Huelo License Area are depicted in Figure 43 and summarized in Table 9.

### 2.5.3.1 Sinoto and Pantaleo (1992)

Intermittently between 17 June and 3 September 1992, Aki Sinoto Consulting conducted an AIS of the East Maui Waterline Project (TMKs: [2] 2-5-003, 004, 005; 2-7-003, 007-011, 013, 016-020; 3-8-051, 059, 061, 070, and 071), consisting of surveys of gulches and pedestrian surveys, mostly along existing paved roads and cane roads (Sinoto and Pantaleo 1992). Easternmost parcels surveyed in this study are located near the current License Area. No cultural materials were observed during this AIS.

### 2.5.3.2 Kennedy et al. (1992)

From the end of July to the beginning of August 1992, Archaeological Consultants of Hawaii, Inc. carried out an AIS with subsurface testing at a parcel located about one mile inland from the ocean, near Hanawana Stream, and adjacent to the *mauka* side of the Hāna Hwy in West Hanawana Ahupua'a (TMK: [2] 2-9-010:003) (Kennedy et al. 1992). Three historic properties were recorded, including a set of five mounds associated with post-Contact agriculture (SIHP # 50-50-06-3132), six agricultural terraces with two *auwai* and three walls associated with both pre- and post-Contact agriculture (SIHP # -3133), and a complex of two irrigated terraces with one *auwai* and five wall segments associated with both pre- and post-Contact agriculture (SIHP # -3134). In addition, a ceramic and concrete scatter was discussed but was only addressed as Temporary site # T-1.

### 2.5.3.3 D. L. Fredericksen (1996)

In April 1996, Xamanek Researches conducted a limited AIS on a 25.12 acre Ho'olawa Point parcel in Ho'olawa Bay, Huelo (TMK: [2] 2-9-02:014 por.) (D. L. Fredericksen 1996). Pre-Contact artifacts encountered during this pedestrian survey included an adze blank, three utilized basalt flakes, a large piece of red ochre, a piece of volcanic glass, and several waterworn stones. SIHP # 50-50-06-4167, an old roadway, was identified on the surveyed parcel. Historic cultural materials associated with SIHP # -4167 encountered near the roadway include glass and porcelain fragments, one piece of *Conus* shell, broken Maui Soda bottles from the 1920s/30s, a possible old wagon wheel rim, and pieces of rusting metal track. SIHP # -4196, a historic grave with inscription "JHO Nokaupu Make Feb 14 1918" was also observed on the property. Ho'olawa Landing, SIHP # -2956 was identified to the east of Ho'olawa Stream, beyond the property borders but within close proximity to the surveyed area; brick and concrete footings, four large pieces of rusting machinery, and a set of railroad car wheels were observed in association with SIHP # -2956. Both SIHP #s -4167 and -2956 comprise part of a historical complex associated with the sugarcane

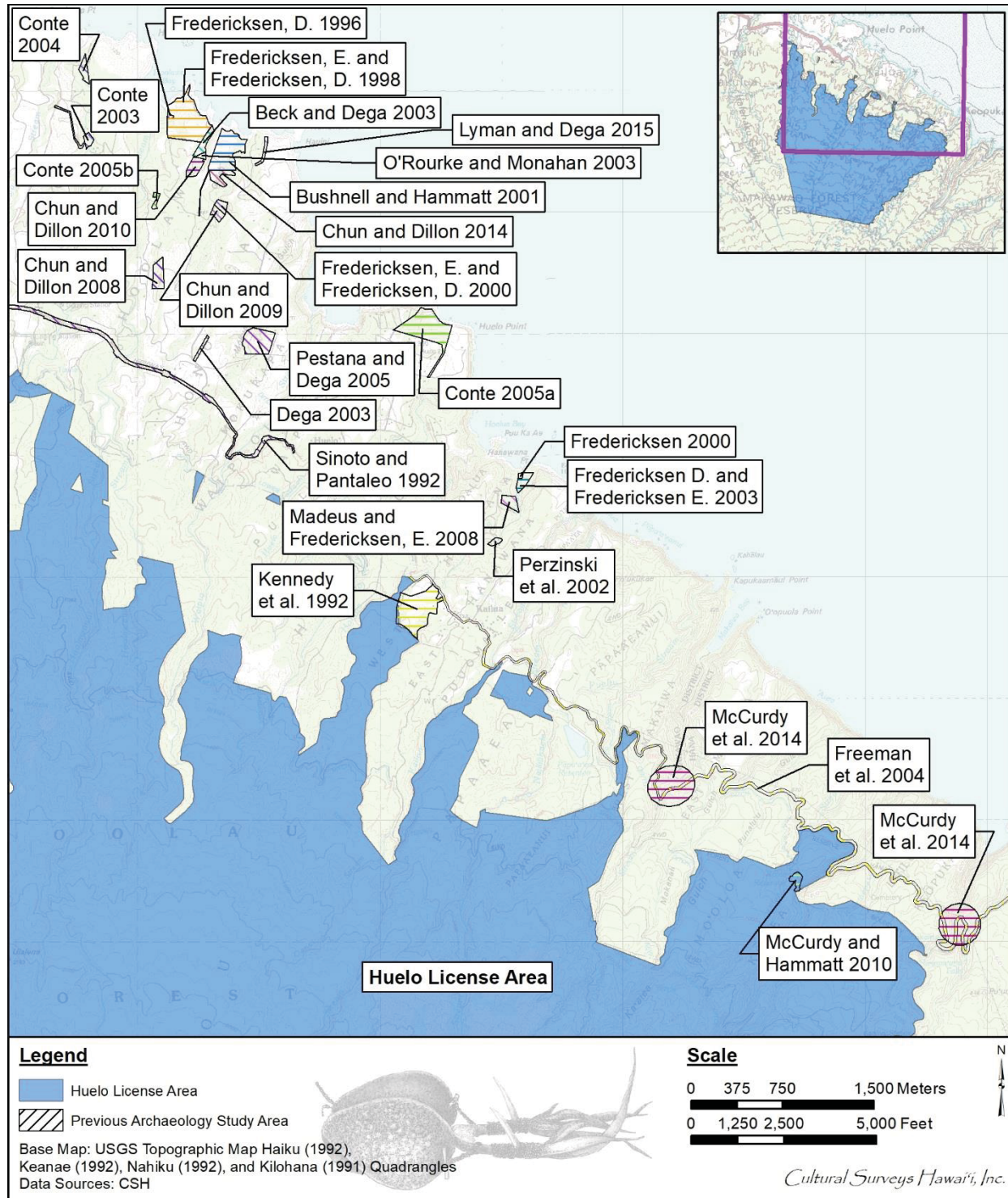


Figure 43. Previous archaeological studies within or near the Huelo License Area (U.S. Geological Survey 1991, 1992a, c, d)

Table 9. Previous Archaeological Studies within the Huelo License Area

Reference	Type of Study	Location	Results (SIHP # 50-50-06)
Sinoto and Pantaleo (1992)	AIS	East Maui Waterline Project (TMKs: [2] 2-5-003, 004, 005; 2-7-003, 007-011, 013, 016-020; 3-8-051, 059, 061, 070, and 071)	No significant findings
Kennedy et al. (1992)	AIS	Parcel located about a mile inland from the ocean, near Hanawana Stream, and adjacent to the Hāna Hwy in West Hanawana Ahupua'a, (TMK: [2] 2-9-010:003)	Documented three sites, including a set of five mounds (SIHP # 50-50-06-3132), six agricultural terraces with two 'auwai and three walls (SIHP # -3133), and a complex of two irrigated terraces with one 'auwai and five wall segments (SIHP # -3134)
D. L. Fredericksen (1996)	Limited AIS	25.12-acre Ho'olawa Point parcel in Ho'olawa Bay, Huelo (TMK: [2] 2-9-002:014 por.)	Documented SIHP # -4196, a historic grave and SIHP -4167, an old roadway with associated artifacts; noted SIHP # -2956 (Hoolawa Landing) with associated brick and concrete footings, four large pieces of rusting machinery, and a set of railroad car wheels to the east of Ho'olawa Stream near the surveyed area; noted a rockshelter near, but beyond the property boundaries

Reference	Type of Study	Location	Results (SIHP # 50-50-06)
Erik M. Fredericksen and Demaris L. Fredericksen (1998a)	AIS	25.12-acre Ho'olawa Ranch Property at Ho'olawa Point (TMK: [2] 2-9-002:014)	Reidentified SIHP # -4167 (Ho'olawa Landing Road) and SIHP # -2956 (historic grave). Documented five additional sites: SIHP #s -4234 (historic grave); -4235 and -4236 (surface scatters); -4237 (subsurface pre-Contact fire pit with a 14C date range from AD 1435 to 1660); -4238 (stone feature with a possible burial; observed SIHP # -2956 (Hoolawa Landing) and a rockshelter/temporary habitation site (SIHP # -4239) outside property borders
E. Fredericksen (2000)	AIS Phase I	Northwestern terraced area on a parcel of land near the mouth of Hanawana Stream in Hanawana Valley, Hanawana Ahupua'a (TMK: [2] 2-9-011:018)	Documented two terraced features of agricultural and habitation complex SIHP # -4153; reported 14C date range from AD 1425 to 1665 for a charcoal sample; noted three small terraces, a cobble and boulder platform, an enclosure, a rock cupboard, a possible canoe landing area, and a depression for ground salt water evaporation on state lands beyond the property borders
E. M. Fredericksen and Fredericksen (2000)	AIS	2-acre Lot 7-B of Huelo Hui Partition Subdivision located within 400 m of the ocean crossed by Honokala Stream, and bordered by North Honokala Rd (TMK: [2] 2-9-002:005 por.)	Documented two historic properties: a pre-Contact wetland agricultural site (SIHP # -4084) and a leveled area associated with post-Contact ranching or agriculture (SIHP # -4816)



Reference	Type of Study	Location	Results (SIHP # 50-50-06)
Bushnell and Hammatt (2001)	AIS	Roadway access easement and 15-acre parcel in coastal Ho'olawa, bordered by Honokala Stream and Waikakulu Gulch (TMKs: [2] 2-9-02:017, 021, and 035)	No significant findings
Perzinski et al. (2002)	AIS	West Hanawana, between Hāna Hwy. and the coast (TMKs: [2] 2-9-011:004 and 005)	Documented an agricultural complex consisting of 15 terraces (SIHP # -5206), and an <i>'auwai</i> (SIHP # -5205); reported a 14C date range from AD 990 to 1220 obtained from sediments underlying a terrace retaining wall
Dega (2003)	Archaeological assessment	5 acres at Ho'olawa Point (TMKs: [2] 2-9-001:071, 072 and 075)	No significant findings
Beck and Dega (2003)	AIS	Approximately 3.5 acres in coastal Ho'olawa, transected by Waikakulu Gulch and Stream (TMK: [2] 2-9-012:016)	No significant findings
O'Rourke and Monahan (2003)	AIS	Approximately 0.75 acres in the Ahupua'a of Ho'olawa, Hawaii (TMK: [2] 2-9-002:042)	Described SIHP # -5459, a human burial, and SIHP # -5460, a lithic reduction center
Conte (2003)	Limited AIS	0.371-acre access easement corridor in coastal Honopou Ahupua'a (TMKs: [2] 2-9-001:004, 018 and 019)	No significant findings

Reference	Type of Study	Location	Results (SIHP # 50-50-06)
D. L. Fredericksen and Fredericksen (2003)	AIS Phase II	3.094 acres in Hanawana Gulch in Hanawana Ahupua'a (TMK: [2] 2-9-011:018)	Documented 52 previously unreported features from SIHP # -4153, including a leveled area, pavement, a cupboard, 47 terraces, an alignment, and a possible terrace remnant; identified numerous artifacts; reported date ranges for five charcoal samples: AD 1520 to 1590, AD 1620 to 1680 and AD 1730 to 1810 (Sample 1), AD 1640 to 1960 (Sample 2), AD 1460 to 1640 (Sample 4), AD 1670 to 1950 (Sample 5), and AD 1420 to 1520 and AD 1580 to 1630 (Sample 6)
Conte (2004)	AIS and preservation plan	2.541-acre Souza Property (TMK: [2] 2-9-001:009) at coastal Honopou Point, Honopou Ahupua'a	Documented three features of SIHP # -5638, including two terraces and an alignment, interpreted as <i>māla'ai</i>
Conte (2005b)	AIS	1.095-acre parcel located a half a mile from Ho'olawa Bay bordered north by Ho'olawa Stream (TMK: [2] 2-9-001:075)	Documented Features A-E ( <i>lo'i</i> terrace remnants) of SIHP # 50-50-04-5720
Conte (2005a)	AIS	Bolles Property, a 20-acre parcel located on the coast between Waipi'o Bay and Huelo Point (TMK: [2] 2-9-07:052)	Identified SIHP #s: 50-50-06-5746, -5747, -5748, -5749, -5750, and -5751, which included terraces, walls, and a possible trail alignment.
Pestana and Dega (2005)	Archaeological assessment	11.15 acres near Waipi'o Bay, Huelo (TMK: [2] 2-9-005:023)	No significant findings
Chun and Dillon (2008)	AIS	5.128-acre lot in Ha'iku, Ho'olawa Ahupua'a (TMK: [2] 2-9-003:028)	Documented SIHP # -6438, a stacked rock wall interpreted as remnants of an <i>'auwai</i>

Reference	Type of Study	Location	Results (SIHP # 50-50-06)
Madeus and Fredericksen (2008)	AIS	3.136-acre parcel in Hanawana Ahupua'a, (TMK: [2] 2-9-011:017)	Reported SIHP # -6362, a pre-Contact agricultural complex with 19 stepped agricultural terrace features
Chun and Dillon (2009)	AIS	2-acre lot in Huelo, coastal Honokalā (TMK: [2] 2-9-002:041)	Identified five <i>lo'i</i> and three terraces in pre-Contact agricultural complex SIHP # -4084; documented SIHP # -6627, a historic trash pit
McCurdy and Hammatt (2010)	AIS	4-acre parcel in Kolea Ahupua'a (TMK: [2] 1-1-001:050)	Identified one plantation era reservoir/water control system SIHP # 50-50-13-6682; with six associated features
Chun and Dillon (2010)	AIS	3.75-acre Lot in Ha'iku, coastal Ho'olawa on an easement of Ho'olawa Road (TMK: [2] 2-9-002:011)	Reported one site previously documented by O'Rourke and Monahan (2003): SIHP # 50-50-06-5460, a lithic reduction center
Chun and Dillon (2014)	Archaeological assessment	3.65-acre lot in Ha'iku on a Ho'olawa Road easement bordered by Honokala Stream (TMK: [2] 2-9-002:020)	No significant findings
Lyman and Dega (2015)	AIS	Rohr Family access road at Honokalā Point in Honopou Ahupua'a (TMK: [2] 2-9-002:019 por.)	Identified SIHP # -8254, a terrace retaining wall, and SIHP # -8255, a pre-Contact to historic ditch for <i>'auwai</i>

industry. Also, a rockshelter that was likely used historically and during the pre-Contact era was observed near but beyond the property boundary.

#### **2.5.3.4 Erik M. Fredericksen and Demaris L. Fredericksen (1998a)**

In 1996, Xamanek Researches continued an AIS of a 25.12 acre Ho'olawa Ranch Property at Ho'olawa Point (TMK: [2] 2-9-02:014) (Erik M. Fredericksen and Demaris L. Fredericksen 1998a). An earlier survey of this property was limited to the western portion where Ho'olawa Landing Road (SIHP # -4167) with associated artifacts and a historic grave (SIHP # -2956) were reported (D. L. Fredericksen 1996); these two sites were reidentified during this more thorough subsequent AIS, which included both pedestrian surface survey throughout the property and subsurface testing. Five additional archaeological sites were also documented: a historic grave (SIHP # -4234), two surface scatter remnants (SIHPs # -4235 and -4236), a pre-Contact fire pit (SIHP # -4237) and a rock alignment including a possible burial (SIHP # -4238). Artifacts observed at the surface associated with the surface scatter remnant SIHP # -4235 include a basalt adze blank, utilized basalt flakes, a utilized volcanic glass flake, and red ochre, and waterworn pebbles; subsurface artifacts include a volcanic glass flake, two basalt flakes (one fire-cracked), charcoal, rusted metal, a possible fishing hook tab and pig bone. No artifacts were encountered during subsurface testing of the surface scatter remnant SIHP # -4236; however, a volcanic glass flake, two pieces of volcanic glass shatter, and a basalt flake were observed at the surface. The fire pit (SIHP # -4237) was encountered below the surface at a level area overlooking Ho'olawa Bay and the Hāna Coast. Associated subsurface cultural materials include rusted metal waterworn pebbles, fire-cracked rocks, charcoal, basalt flakes, volcanic glass debitage, and a pecking stone. Analyzed charcoal collected from the fire pit (SIHP # -4237) returned a calibrated (2 sigma, 95% probability) 14C date range of AD 1435 to 1660. A possible basalt pecking stone was observed at the surface in association with the stone feature with a possible burial (SIHP # -4238), while subsurface testing revealed modern bottle glass, utilized basalt and waterworn pebbles. Also, Ho'olawa Landing (SIHP # -2956) and a rockshelter were again observed outside the property boundary, as they had been in the D. L. Fredericksen (1996) AIS. The rockshelter, which had been interpreted as a temporary habitation site, was designated SIHP # -4239.

#### **2.5.3.5 E. Fredericksen (2000)**

In February 2000, Xamanek Researches, conducted Phase 1 of an AIS of a northwestern terraced area on a parcel of land near the mouth of Hanawana Stream in Hanawana Valley, Hanawana Ahupua'a (TMK: [2] 2-9-011:018). The AIS included a visual inspection with mapping of the area and two test unit excavations (E. Fredericksen 2000). Two terraced features were documented: an approximately 15-m x 6-m leveled area with a partially intact retaining wall (Feature A), and a narrow approximately 14-m long terrace (Feature B) located upslope from Feature A. Only one artifact was observed on the surface, a grindstone located near Feature A. During subsurface testing, charcoal deposits, a red ochre manuport, four basalt flakes, and a piece of *kukui* nut shell were encountered. A charcoal sample yielded radiocarbon dates from AD 1425 to 1665. The features documented in this study appeared to be part of SIHP # -4153, likely an agricultural and habitation complex, which was noted as extending both downstream and upstream on adjacent parcels of State-owned land. The adjacent features of SIHP # -4153 on State lands include three small terraces, a cobble and boulder platform, an enclosure, a rock cupboard, a possible canoe landing area, and a depression for ground salt water evaporation.



### **2.5.3.6 E. M. Fredericksen and Fredericksen (2000)**

From December 1999 through February 2000, Xamanek Researches conducted an AIS on a 2-acre (Lot 7-B) of the Huelo Hui Partition Subdivision, located within 400 m of the ocean shore and crossed in the west by Honokala Stream (TMK: [2] 2-9-002:005 por.) (E. M. Fredericksen and Fredericksen 2000). Two historic properties are reported: SIHP # -4084, a pre-Contact wetland agricultural site, and SIHP # -4816, a leveled area associated with post-Contact ranching or agriculture.

### **2.5.3.7 Bushnell and Hammatt (2001)**

On 29 March 2001, CSH conducted an AIS for a proposed Kahui Pono L.L.C. Roadway Access Easement and 15-acre parcel (TMKs: [2] 2-9-002:017, 021, and 035) in coastal Ho'olawa, bordered to the east by Honokala Stream, and partially on the west by Waikakulu Gulch (Bushnell and Hammatt 2001). No historic properties were identified.

### **2.5.3.8 Perzinski et al. (2002)**

On 22 February 2002, CSH conducted an AIS of a proposed approximate 800-foot easement and one-acre lot in West Hanawana (TMKs: [2] 2-9-011:004 and 005) (Perzinski et al. 2002). The survey identified an agricultural complex consisting of 15 terraces (SIHP # -5206), and an *'auwai* (SIHP # -5205) supplying the complex of *lo'i*. Several of the terraced *lo'i* still support feral taro plants; two large stands of *'awa* were also observed in the area. Remnants of recent squatters' sheds were also present on the property. A 14C date of AD 990-1220 was obtained from sediments underlying a terrace retaining wall.

### **2.5.3.9 Dega (2003)**

On 4 April 2003, Scientific Consultant Services, Inc. (SCS) conducted a surface survey for 5 acres at Ho'olawa Point (TMKs: [2] 2-9-001:071, 072, and 074) (Dega 2003). No historic properties were observed; therefore, the report was submitted as an archaeological assessment.

### **2.5.3.10 Beck and Dega (2003)**

On 6-7 April 2003, SCS conducted an AIS of approximately 3.5 acres in coastal Ho'olawa with Waikakulu Gulch and Stream transecting the east end of the property (TMK: [2] 2-9-002:016) (Beck and Dega 2003). The AIS consisted of a pedestrian survey and two shovel test probes. No historic properties were identified.

### **2.5.3.11 O'Rourke and Monahan (2003)**

Between 7 May and 11 June 2003, SCS conducted an AIS of approximately 0.75 acres of land located in coastal Ho'olawa (TMK: [2] 2-9-002:042), which consisted of pedestrian survey and subsurface testing (O'Rourke and Monahan 2003). The study describes two historic properties: SIHP # -5459, a human burial, and SIHP # -5460, a lithic reduction center.

### **2.5.3.12 Conte (2003)**

On July 8, 2002, CRM Solutions Hawai'i, Inc, conducted an AIS of a designated access easement corridor through the Huelo Hui Partition on 0.37- acres at coastal Honopou Ahupua'a, (TMKs: [2] 2-9-001:004, 018, and 019) (Conte 2003). No historic properties were identified.

### 2.5.3.13 D. L. Fredericksen and Fredericksen (2003)

In 2002, Xamanek Researches carried out Phase 2 of an AIS of 3.094 acres in Hanawana Gulch in Hanawana Ahupua'a (TMK: [2] 2-9-011:018), consisting of pedestrian survey and five manual test excavations (D. L. Fredericksen and Fredericksen 2003). Phase I had been limited to a northwestern terraced area, in which two features and a few pre-Contact artifacts were identified as being constituents of agricultural complex SIHP # -4153 (E. Fredericksen 2000). During Phase 2, 52 previously unreported features were documented as part of SIHP #- 4153: a leveled area, pavement, a cupboard, an alignment, 47 terraces, and a possible terrace remnant. A polishing stone and lithic debitage were found on the surface. Numerous artifacts were encountered during subsurface testing, including polished basalt flakes, utilized basalt flakes, a basalt hammerstone/chopper, a worked urchin spine tip, a utilized volcanic glass flake, an adze fragment, and Lead printer's type. Mammal and fish bone, *kukui* nut shell, charcoal, lithic debitage, unworked coral pieces, waterworn pebbles, fire-cracked rocks, metal pieces, coal and a lead fishing weight were also documented cultural materials. Five charcoal samples (Samples 1-2; 4-6) returned the following radiocarbon dates (calendrical date 2 Sigma 95%): AD 1520 to 1590, AD 1620 to 1680 and AD 1730 to 1810 (Sample 1), AD 1640 to 1960 (Sample 2), AD 1460 to 1640 (Sample 4), AD 1670 to 1950 (Sample 5), and AD 1420 to 1520 and AD 1580 to 1630 (Sample 6).

### 2.5.3.14 Conte (2004)

On 4 September 2004, CRM Solutions Hawai'i conducted an AIS for the 2.541-acre Souza Property (TMK: [2] 2-9-001:009) at coastal Honopou Point, bisected by Honopou Stream in Honopou Ahupua'a (Conte 2004). The AIS consisted of pedestrian survey and the backhoe excavation of three test trenches. No cultural materials were encountered during subsurface testing. During pedestrian survey, three features were observed above the east side of Honopou Stream. These features were reported as one site, SIHP # -5638, which included two terraces (Features A and C) and an alignment (Feature B), collectively interpreted as a *māla'ai*. A preservation plan recommending passive preservation was submitted as part of this study.

### 2.5.3.15 Conte (2005b)

On 15 and 18 July 2005, CRM Solutions Hawai'i, Inc. (Conte 2005b) conducted an AIS of a 1.095-acre parcel located a half a mile from Ho'olawa Bay bordered north by Ho'olawa Stream (TMK: [2] 2-9-001:075). During this pedestrian survey, five *lo'i* terrace remnants (Features A-E) comprising SIHP # 50-50-04-5720 were observed along the northern slope of the property.

### 2.5.3.16 (Conte 2005a)

Intermittently between July and October 2005, CRM Solutions Hawai'i, Inc. conducted an AIS of the Bolles Property (TMK: [2] 2-9-007:052), a 20-acre parcel located on the coast between Waipi'o Bay and Huelo Point (Conte 2005a). Six historic properties were identified during the study: a double linear terrace (SIHP # 50-50-06-5746), a walled terrace with lower terraces (SIHP # -5747), a walled terrace with lower terraces and possible trail alignment (SIHP # -5748), a remnant wall (SIHP # -5749), a small, historic-era terrace (SIHP # -5750), and a discontinuous rock wall (SIHP # -5751).

### 2.5.3.17 Pestana and Dega (2005)

In June 2005, SCS conducted an AIS for 11.15 acres of land near Waipi'o Bay (TMK: [2] 2-9-005:023), consisting of pedestrian surface survey and mechanical and manual subsurface testing (Pestana and Dega 2005). No historic properties were identified therefore, this study was deemed an archaeological assessment.

### 2.5.3.18 Chun and Dillon (2008)

On 18 February 2008, Affordable Cultural & Ecological Services, LLC (ACES) carried out an AIS for 5.128 acres in Ha'iku, Ho'olawa (TMK: [2] 2-9-003:028) (Chun and Dillon 2008). During this 100% pedestrian survey, one historic property was documented. SIHP # -6438 is a stacked rock wall located on the west and east sides of a stream that was interpreted as remnants of an *'auwai*.

### 2.5.3.19 Madeus and Fredericksen (2008)

In October 2007, Xamanek Researches, LLC conducted an AIS for a 3.136-acre parcel near the coast in Hanawana Valley bordered by Hanawana Stream, in Hanawana Ahupua'a, (TMK: [2] 2-9-011:017) (Madeus and Fredericksen 2008). The AIS included a pedestrian survey and the excavation of five shovel test units that identified one historic property. SIHP # -6362 is a pre-Contact agricultural complex with 19 component features consisting of stepped agricultural terraces.

### 2.5.3.20 Chun and Dillon (2009)

In December 2008 and January 2009, ACES conducted an AIS for a 2.0-acre lot located approximately 650 m from the shore in Honokalā (TMK: [2] 2-9-002:041) (Chun and Dillon 2009). The surveyed parcel is bound by N. Honokalā Road to the west and contains a stream gully from Honokalā Stream oriented from south to north through the western third portion of the property. Fieldwork consisted of pedestrian survey and subsurface testing, including six shovel test probes, four test units, one shovel excavated stratigraphic trench, and five backhoe trenches. Eight features, comprising a portion of previously identified SIHP # -4084, a pre-Contact agricultural complex, were documented in this AIS: a remnant *lo'i* (Feature 1), a 11.5-m by 7.6-m rectangular *lo'i* (Feature 2), a 7.6-m by 6.6-m *lo'i* (Feature 3), an 11.8-m by 8.4-m *lo'i* (Feature 4), a 12.2-m by 5-8-m *lo'i* (Feature 5), a terrace measuring approximately 12 m by 5 m (Feature 6), a narrow terrace at least 30 m long (Feature 7), and a terrace at least 4 m long retained by a 4-m long wall (Feature 8). SIHP # -6627, an historic trash pit, was also identified during this study. The only historic cultural materials encountered during subsurface testing were metal, glass, and porcelain associated with SIHP # -6627.

### 2.5.3.21 McCurdy and Hammatt (2010)

On 23 and 24 February 2010, CSH conducted an AIS of 4.0 acres located approximately 430 m southwest of the Waikamoi Ridge trailhead for the Kolea Reservoir Decommissioning Project (TMK: [2] 1-1-001:050) (McCurdy and Hammatt 2010). The project is located within the northeast portion of the Huelo License Area of the current project. One historic property was identified during this survey: SIHP # 50-50-13-6682, a plantation-era reservoir/water control system constructed in 1901 with six associated features. These features include the spillway (Feature A),

reservoir (Feature B), a catwalk (Feature C), the dam (Feature D), the reservoir outlet (Feature E), and a water diversion structure (Feature F).

#### **2.5.3.22 Chun and Dillon (2010)**

On 14 and 19 March and 19 April 2010, ACES carried out an AIS for a 3.75-acre lot in Ha'iku approximately 1.8 km *makai* of Hāna Highway on a Ho'olawa Road easement (TMK: [2] 2-9-002:011), consisting of pedestrian survey and three backhoe excavated test trenches (Chun and Dillon 2010). During the surface survey, SIHP # 50-50-06-5460, a lithic reduction center previously documented by O'Rourke and Monahan (2003) was observed with a few associated basalt flakes and a hammerstone. Light scatters of waterworn cobble manuports were encountered in the first stratum of all three test excavations.

#### **2.5.3.23 Chun and Dillon (2014)**

During four days in June 2014, ACES conducted an archaeological assessment for a 3.65-acre lot in Ha'ikū on an easement off Ho'olawa Road along the western bank of Honokala Stream (TMK: [2] 2-9-002:020), which included a 100% pedestrian survey and nine backhoe excavated trenches (Chun and Dillon 2014). No historic properties were identified.

#### **2.5.3.24 Lyman and Dega (2015)**

In March 2015, SCS conducted an AIS of a Rohr Family access road at Honokalā Point in Honopou Ahupua'a (TMK [2] 2-9-002:019 por.) (Lyman and Dega 2015). During this 100% pedestrian survey, two historic properties were identified. SIHP # -8254 is a terrace retaining wall for slope stabilization and SIHP # -8255 is a pre-Contact to historic ditch for *'auwai*.

### **2.5.4 Honomanū License Area Archaeological Studies**

Previous archaeological studies conducted in the vicinity of the Honomanū license area have been addressed elsewhere in this report, since the studies associated with this license area either occurred near all license areas (S. D. M. Freeman et al. 2004; Madeus and Hammatt 2017; McCurdy et al. 2014) or were located closer to adjacent license areas (Group 70 International et al. 1995; A. Haun and Henry 2003; Hill et al. 2008; Kennedy 1990; McCurdy and Hammatt 2010; Palama 1981; Soehren 1963). The portions of these previous archaeological study areas within the Honomanū License Area are depicted in Figure 44.

### **2.5.5 Ke'anae License Area Archaeological Studies**

Previous archaeological studies conducted within or near the Ke'anae License Area are depicted in Figure 45 and summarized in Table 10.

#### **2.5.5.1 Soehren (1963)**

In 1963, Bernice P. Bishop Museum conducted an archaeological survey of portions of East Maui, which included Ke'anae and Wailua (Soehren 1963). Two *heiau*, Kukuiaupun Heiau and Makehau Heiau, previously documented by Walker (1931), were located. Both *heiau* were densely overgrown with vegetation and in poor condition. Additionally, several coastal Wailuanui sites were documented including, Pu'u Olu Pond bordered to the north by a stone wall, a small house platform overlooking Pu'u Olu Pond, a house platform near Paepaemoana Point, a possible post-Contact cemetery consisting of a cluster of 14 graves, several scattered probable graves with rough



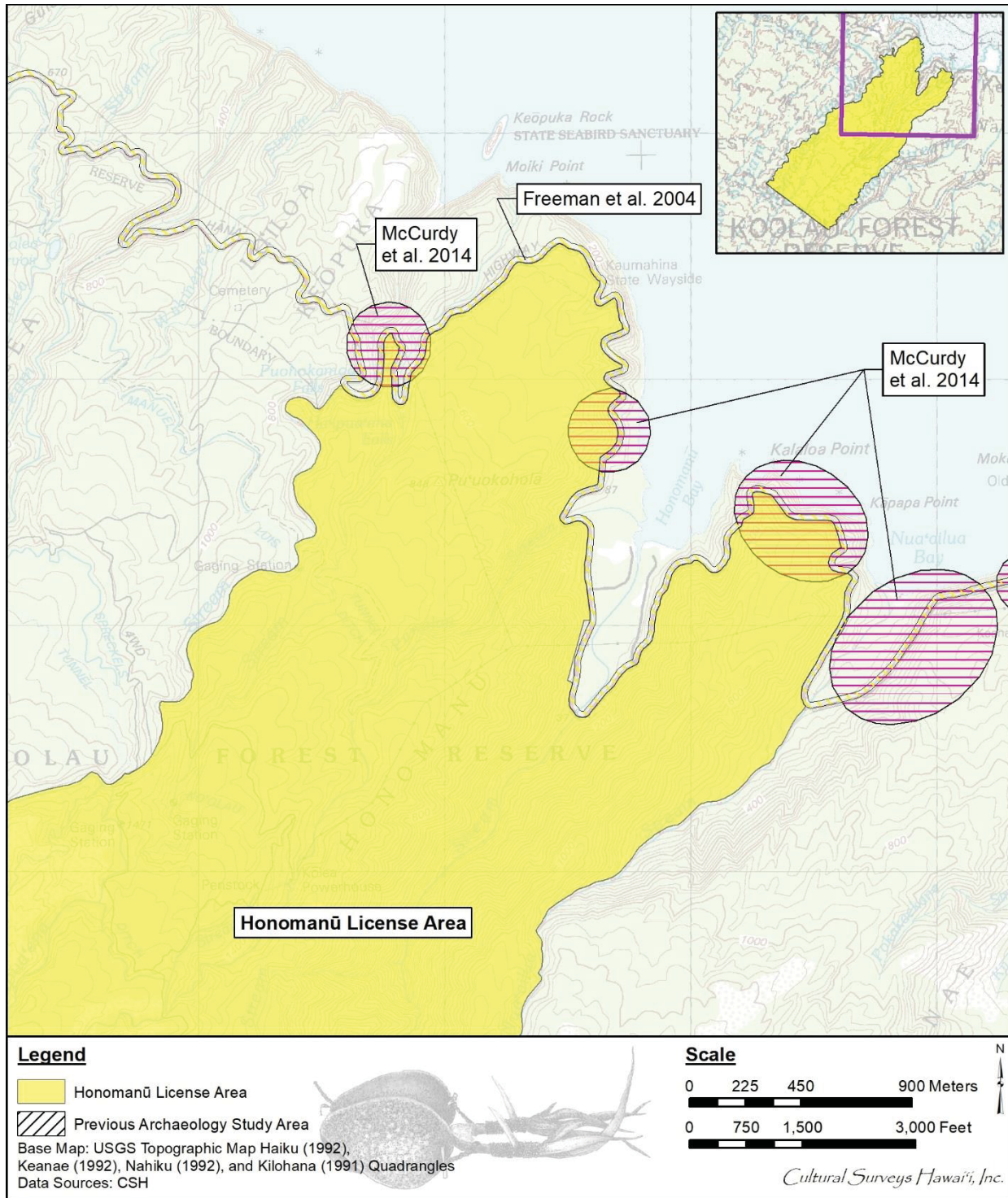


Figure 44. Previous archaeological studies within or near the Honomanū License Area (U.S. Geological Survey 1991, 1992a, c, d)



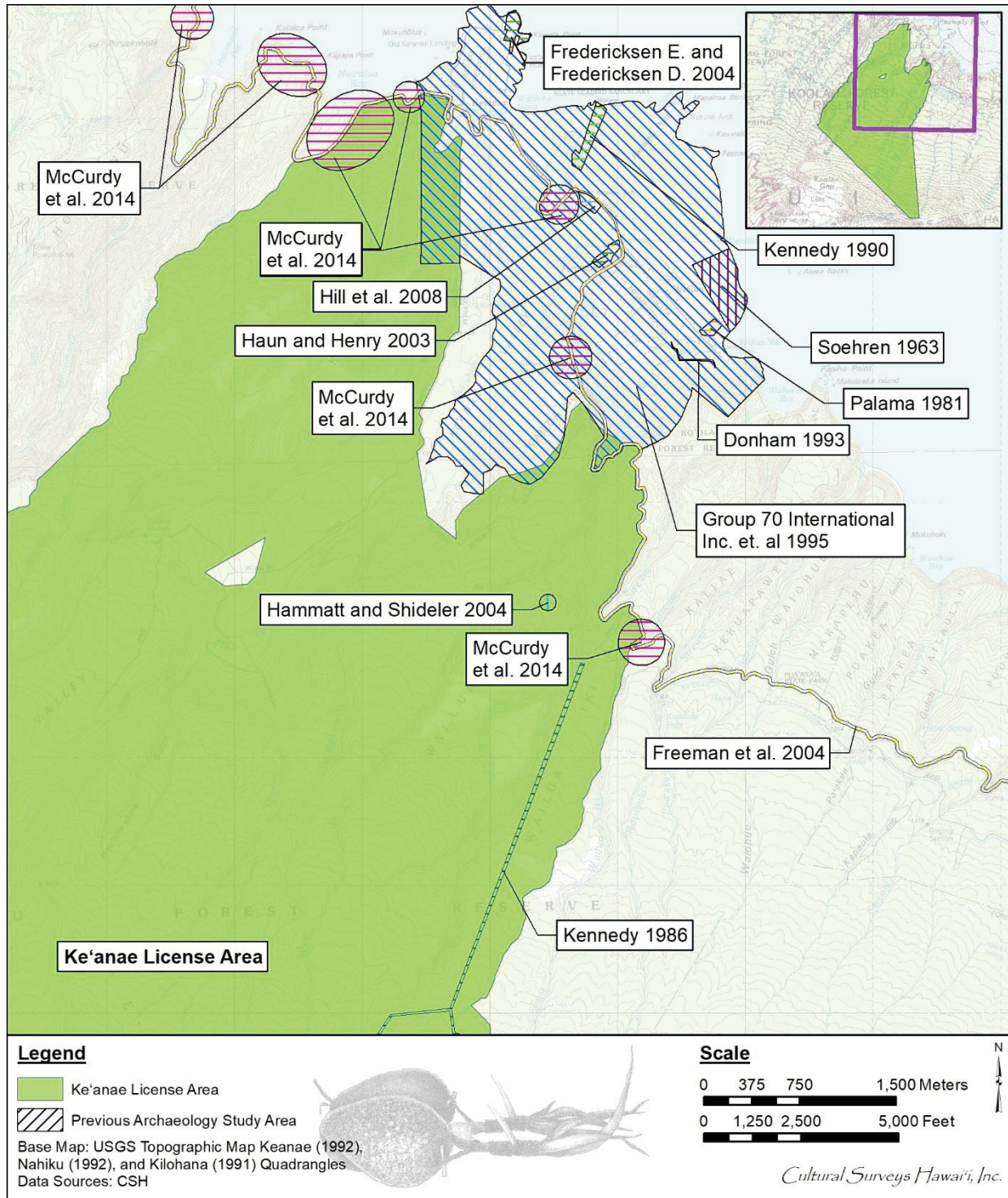


Figure 45. Previous archaeological studies within or near the Ke'anae License Area (U.S. Geological Survey 1991, 1992a, c, d)

Table 10. Previous Archaeological Studies within the Ke'anae License Area

Reference	Type of Study	Location	Results (SIHP # 50-50-07)
Soehren (1963)	Archaeological survey	Portions of east Maui, including Ke'anae and Wailua	Documented Pu'u Olu Pond bordered north by a stone wall, a small house platform overlooking Pu'u Olu Pond, a house platform near Paepaemoana Point, a possible post-Contact cemetery consisting of a cluster of 14 graves and several scattered probable rough stone outlined graves, remnants of stone walls forming adjoining enclosures (either house or shrine site), and a stone wall enclosure with a doorway and associated nearby possible grave and collapsed stone wall; confirmed Kukuiaupun Heiau and Makehau Heiau
Palama (1981)	Archaeological field inspection	Parcel of Wailua State Land	No significant findings on inspected parcel; noted stone alignments outside the property boundaries
Kennedy (1986)	Archaeological land inspection	Land along a 1930s Civilian Conservation Corps (CCC) trail in East and West Wailuaiki	No archaeological sites observed during survey; possible sites reported from interviews with locals include two contemporary hunting or gathering sites, a shrine near West Wailuaiki Stream destroyed in a 1975 flood, a shrine in a nonspecific location where <i>wauke</i> and <i>Olonā</i> grow, and a canoe builders shrine where a <i>koa</i> tree was removed to construct a Hawaiian canoe in the 1950s; one resident also reported the nearby presence of a cave containing a feathered cloak, but another local informant provided a contrary location near Haleakala Volcano summit for the cave
Kennedy (1990)	Archeological reconnaissance	Parcel near Kainalimu Bay	Identified Site 79, Kauleiula Heiau, previously documented by Walker (1931)
Donham (1993)	Field inspection	Revised route for a road easement beginning at	Documented structural remnants of an old wooden slaughterhouse with a likely associated well or cistern;

Reference	Type of Study	Location	Results (SIHP # 50-50-07)
		Makehau Road and partially oriented along Wailuanui Stream	rock terraces; an old roadbed with retaining wall (SIHP # 50-50-07-43); part of terrace complex (SIHP # -2942); a ditch-like feature; an agricultural terrace wall (SIHP # -2945); and a terraced-walled late 19th/early 20th century habitation site with associated cultural materials
Group 70 International et al. (1995)	Cultural landscape study that included an archaeological field survey	Ke'anae and Wailuanui	Documented SIHP # -3940, a habitation complex in Kilo consisting of terraces and an enclosure; SIHP #s -3932 thru -3938, and -3941, eight taro complexes; SIHP # -3943, Ke'anae Quarry with associated machinery, World War II gun emplacement, and possible stone platformed grave of a former quarry; confirmed SIHP # -0096 Kukuiopuni Heiau; SIHP # -0097, Makehau Heiau; SIHP # -0538, Pu'u Olu Pond, a fishpond with an associated house platforms; SIHP # -1513, Wailua Stone Church Ruins; and SIHP # -2957, Ke'anae Landing
A. Haun and Henry (2003)	AIS	4.0-acres bordered north by Hanau Stream in the Pauwalu area of Hāna District	Documented two features from SIHP # -5237: a pre-Contact temporary habitation shelter (Feature A) and a 63.0-m trail section; reported a charcoal sample with a C14 date range from AD 1420 to 1650
E. M. Fredericksen and Fredericksen (2004)	Archaeological monitoring	Ke'anae Park restrooms	Documented SIHP # -5534, a late pre-Contact agricultural site with associated subsurface deposits; reported a charcoal sample with 14C date ranges of AD 1410 to 1530 and AD 1560 to 1630; noted a possible 'auwai at northwestern edge of SIHP # -5534
Hammatt and Shideler (2004)	Archaeological assessment	Along Wailuaiki Stream, about 1 km west of 1923	No significant findings



Reference	Type of Study	Location	Results (SIHP # 50-50-07)
		Wailuaiki Bridge on the East Maui Irrigation access road. (TMK: [2] 1-1-02:001 por.)	
Hill et al. (2008)	Archaeological monitoring	Ke'anae Elementary School grounds (TMK: [2] 1-1-008:020)	No significant findings during monitoring; noted Ke'anae Elementary School is designated SIHP # -1630 and National Register of Historic Places Building # -00000665; observed SIHP # -0096, Kukui o Puni Heiau, located within approximately 450 ft from License Area

stone outlines (many with sunken centers) in an approximately 3,000 ft<sup>2</sup> area, remnants of stone walls forming adjoining enclosures interpreted as either a house site or shrine, and a stone wall enclosure with a doorway and associated nearby possible grave and collapsed stone wall.

#### **2.5.5.2 Palama (1981)**

On 27 October 1981, Stephen Palama (1981), Pacific Association of Professional Archaeologists member, conducted a field inspection of State Land, Wailua, Hana, Maui (TMK: [2] 1-1-005:001). His results were reported in a short letter dated 28 October 1981 to Mr. Elden K. Liu, in which no archaeological sites were documented on the inspected parcel, though some stone alignments were noted outside the property boundaries.

#### **2.5.5.3 Kennedy (1986)**

During two days in early June 1986, Archaeological Consultants of Hawai'i, Inc. conducted an archaeological land inspection for proposed East and West Wailuaiki Hydroelectric Project, consisting of pedestrian survey along a Civilian Conservation Corps (CCC) trail constructed in the 1930s (TMKs: [2] 1-1-002:001 and 002; 1-2-004:003, 005, 006, 009 and 010; 1-2-001:002) (Kennedy 1986). No archaeological sites were encountered during the survey. However, the entire project area grounds were not surveyed due to dense vegetation causing limited visibility. As a result, consultations with local residents supplemented the investigation. Informants provided mixed accounts regarding the presence or absence of cultural sites in the area. While some residents said that no archaeological sites existed on the project lands, others disagreed. Possible cultural sites reported by residents included two contemporary hunting or gathering sites, a shrine near West Wailuaiki Stream that was destroyed in a 1975 flood, a shrine in a nonspecific location where *wauke* (*Broussonetia papyrifera*) and *Olona* (*Touchardia latifolia*) grow, and a canoe builders shrine. Additionally, one resident reported the nearby presence of a cave containing a feathered cloak, but another local informant provided a contrary location of near Haleakala Volcano summit for the cave. Two residents agreed that the canoe builders shrine referred to the site where a *koa* tree was removed to build a Hawaiian canoe in the mid-1950s. Archaeological monitoring was recommended for the project area.

#### **2.5.5.4 Kennedy (1990)**

In a letter dated 7 March 1990, Joseph Kennedy (1990) discusses an archaeological reconnaissance of a land parcel located near Kainalimu Bay (TMK: [2] 1-3-007:016). Only one archaeological site was identified, Site 79 (Kauleiula Heiau) previously documented by Walker (1931).

#### **2.5.5.5 Donham (1993)**

On 9 December 1992 and 6 January 1993, a field inspection of a revised route for a road easement beginning at Makehau Road and partially oriented along Wailuanui Stream (TMKs: [2] 1-1-006:071 and 1-1-008:001) was conducted (Donham 1993). Twenty meters from Makehau Street near a standing wooden shed, a fallen wooden structure was observed, which appeared to be an old slaughterhouse. Structural remnants included intact beams, corrugated metal roofing, meal cooking pans, glass, and wooden shelving. The age of the site was indeterminate, but observed artifacts were modern. An abandoned well or cistern constructed from dry-laid stones and covered with corrugated metal roofing was located nearby (50 m from Makehau St.) and is probably associated with the wooden structure since water pipes were observed between the two

features. The route's closest point to Makehau Heiau is 19 m east from centerline and small terraces were observed within 9 m of centerline between the route and Makehau Heiau. Further along the route, rock terraces attributed to the terrace complex SIHP # 50-50-07-2942, were observed. Along the southern section of the route, three historic properties were observed: an intact retaining wall for an old roadbed (SIHP # -0043), and two terrace walls (SIHP #s -2944 and -2945). SIHP # -2944, comprised of natural outcrop boulders and stacked cobbles and small boulders, is interpreted as a possible late nineteenth to early twentieth century habitation site due to the associated cultural materials encountered at the site, which include 'opihi shells, kukui nuts, dark-brown bottle glass, clear glass, whiteware bowl sherds (some hand-painted), three sizes of clear bottles with applied glass manufacturer stamps, embossed proprietary panel bottles, dark-brown bottles with kick-up bases, gallon-size glass jugs, English transfer print whiteware plate sherds, and impressed yellowware bowl sherds. SIHP # -2945 is interpreted as an agricultural terrace wall. A ditch-like feature, which may have derived naturally, was also observed along the southern portion of the route.

### 2.5.5.6 Group 70 International et al. (1995)

In May 1995, Group 70 International, Inc., Dr. Davianna McGregor, and CSH prepared a multidisciplinary cultural landscape study of Ke'anae and Wailuanui, reporting information obtained from literature and document searches, field surveys, and personal interviews (Group 70 International et al. 1995). Archaeological field surveys were conducted during September and October 1994, which also included interviewing local residents and mapping and describing taro cultivation areas. In total, 41 sites are discussed in this study including 14 *heiau*, a shrine, eight taro complexes, two habitation complexes, three rock terrace sites, an old roadbed wall, a fishpond, and 11 post-Contact historic places. The 14 *heiau* (SIHP #s 50-50-07-0082 thru -0084, -0088, and -0090 thru -0097, Kanekauo Lono Heiau, and Paliuli Heiau) and the shrine (Lelewi) were previously documented by Walker (1931), and of these, only two, Kukuiopuni Heiau (SIHP # -0096) and Makehau Heiau (SIHP # -0097), were investigated during the study. Both confirmed *heiau* were noted as being densely overgrown and in conditions similar to previous reports. Pu'u Olu Pond, a fishpond with an associated small house platform overlooking the pond and a historic to modern foundation platform of grass house near Paepaemoana point (SIHP # -0538), was another previously recorded site confirmed during the study. Nine complexes were first documented during this study: SIHP #s 50-50-07-3932, -3933, -3934, -3935, -3936, -3937, -3938, -3940, and -3941. All these sites are taro complexes with the exception of SIHP # -3940, a habitation complex in Kilo consisting of terraces and an enclosure. The other habitation complex discussed in the study (though not investigated) is previously documented SIHP # -0539 (Wailuanui Complex), which consists of 15 graves, two possible house sites, a wall, a terrace, and three modified outcrops. While noted in the report as being documented in previous studies, none of the terrace sites (SIHP #s -2942, -2944, and -2945) nor the wall for a roadbed (SIHP # -2943) were confirmed. Although not included as an archaeological site, the traditional Pi'ilani Trail in the Ko'olau region is listed as an important cultural resource (Group 70 International et al. 1995:145). Post-Contact historic places mentioned, but not investigated during this study, include Puohokamo Bridge (SIHP # -1509), Lin Hing Society Building (SIHP # -1510), Lanakila Ihiihi o Iehova Ona Kau/ Lanakila Ihiihi o Iehova Ona Kauwa (Congregational church, SIHP # -1511), St. Gabriel Shrine (SIHP # -1512), Wailua Mormon Church (SIHP # -1514), Ramos House (SIHP # -1515), and Waikani Bridge (SIHP # -1516). Wailua Stone Church Ruins (SIHP # -1513) and

Ke'anae Landing (SIHP # -2957) were both confirmed, and SIHP # -3943 (Ke'anae Quarry) was first reported during this study. At the quarry, old machinery, a World War II gun emplacement, and a possible stone platformed grave of a former quarry worker who died in a blasting accident were observed.

#### **2.5.5.7 A. Haun and Henry (2003)**

On 3 August 2002, Haun & Associates conducted an AIS of 4.0-acres bordered north by Hanau Stream in the Pauwalu area of Hāna District (TMKs: [2] 1-1-008:015 and 023) (A. Haun and Henry 2003). During surface survey, two features from SIHP # -5237 were documented: a pre-Contact temporary habitation shelter in the form of a linear overhang with an associated exterior narrow, level ledge (Feature A) and a 63.0-m trail section (Feature B). Only one 'opihi shell fragment was observed at the surface in Feature A, while five *kukui* nut shells, eight basalt flakes, and 77 charcoal fragments were encountered during subsurface testing at Feature A. A charcoal sample yielded a calibrated (2 sigma, 95% probability) 14C date range from AD 1420 to 1650.

#### **2.5.5.8 E. M. Fredericksen and Fredericksen (2004)**

During January and February 2004, Xamanek Researches, LLC monitored ground disturbing activities for Ke'anae Park restroom improvements (TMK: [2] 1-1-003:001) (E. M. Fredericksen and Fredericksen 2004). While monitoring excavation for the septic leach field, SIHP # 50-50-07-5534, a late pre-Contact agricultural site, was encountered with associated subsurface deposits, including two bivalve shell fragments (*Isognoman* spp.), charcoal flecks, and pieces of angular and waterworn coral. A charcoal sample returned calibrated (2 sigma, 95% probability) 14C date ranges of AD 1410 to 1530 and AD 1560 to 1630. A possible 'auwai or stream meander was observed at the northwestern edge of SIHP # -5534.

#### **2.5.5.9 Hammatt and Shideler (2004)**

On 2 July 2003, CSH conducted a field inspection (accepted as an archaeological assessment) of the Wailuaiki and Waihe'e proposed stream gage relocation project areas (TMKs: [2] 1-1-02:001por. and [2] 3-2-014:001por.) (Hammatt and Shideler 2004). For purposes related to the current proposed project, only the Wailuaiki project area inspection (TMK: [2] 1-1-02:001por.) part of this field study is relevant. The Wailuaiki field inspection occurred on lands located along Wailua-iki Stream approximately one kilometer west of the 1923 Wailuaiki Bridge on the East Maui Irrigation access road. The field check found no archaeological sites or historic preservation concerns, with the exception of the Ko'olau Ditch infrastructure that would not be affected by the proposed undertaking.

#### **2.5.5.10 Hill et al. (2008)**

In June and July 2007, Cultural Surveys, Hawai'i, Inc. (Hill et al. 2008) monitored the excavation of trenches for cesspool conversion at Ke'anae Elementary School (TMK: [2] 1-1-008:020). The single room classroom at Ke'anae Elementary School was previously designated SIHP # 50-50-07-1630 and National Register of Historic Places Building # -00000665. Within approximately 450 feet and visible from the school campus is Kukui o Puni Heiau. No subsurface cultural deposits were revealed during excavations.



## 2.5.6 Nāhiku License Area Archaeological Studies

### 2.5.6.1 W. M. Fredericksen and Fredericksen (1978)

On 14 July 1978, Xamanek Researches (W. M. Fredericksen and Fredericksen 1978) conducted an archaeological survey of six power pole sites in a Conservation District in Upper Nāhiku for East Maui Irrigation Company Kuhiwa Well (TMK: [2] 1-2-004:007). No historic properties or archaeological materials were reported.

### 2.5.6.2 W. M. Fredericksen and Fredericksen (1980)

On 6 April 1980, Xamanek Researches conducted the field component of research aimed at determining the degree of prehistoric indigenous Hawaiian activities at Hanawi Stream (TMK: [2] 1-2-001:001) (W. M. Fredericksen and Fredericksen 1980). The stream and adjacent land was surveyed from a horse and/or foot trail that roughly followed “the old Government Road” (W. M. Fredericksen and Fredericksen 1980:3). The study concludes that Hanawi Stream area would not have been a substantial site for prehistoric activities due to its remoteness, surrounding rugged terrain, and lack of significant archaeological features observed. Structural-size stones and *‘ili‘ili* stones observed along the old Government Road were the only indication of a possible pre-Contact archaeological site; these stones may or may not have been part of a *heiau* that was reported to exist on the east rise of Hanawi Stream. A small paved area, interpreted as a modern temporary pavement for fishing/gathering parties, was observed east of the mouth of Hanawi Stream. A heavy walled pot and rusty iron grating were associated with this paved area.

### 2.5.6.3 Erik M. Fredericksen and Demaris L. Fredericksen (1998b)

From January through March 1998, Xamanek Researches conducted an AIS for a 26.967-acre parcel located in Ko‘olau (TMK: [2] 1-2-002:026), consisting of pedestrian survey and subsurface testing (Erik M. Fredericksen and Demaris L. Fredericksen 1998b). Poho‘ula Heiau (SIHP # 50-50-12-99), previously identified by Walker (1931), was encountered, and 11 archaeological properties (SIHP #s 50-50-12-4514 through -4523 and -4548) were documented during this AIS.

SIHP # -4514 is a pre-Contact agricultural and habitation complex, consisting of 24 features including four rock walls (Features A, D, E, and H), five lava tube caves (Features B, F, G, L, and T), five possible temporary habitation rock overhangs (Features C, M, N, K, and R), a modified outcrop interpreted as a possible agricultural shrine (Feature I), a natural enclosure (Feature J), seven terraces (Features O, P, S, U, V, W, and X), and a retaining wall (Feature Q). Two of the lava tubes (Features G and L) are interpreted as burial caves, since they contain human skeletal remains. Artifacts encountered at SIHP # -4514 include two hand axes or hammerstones, two choppers, volcanic glass debitage, and utilized basalt flakes. SIHP # -4515 has four documented features: boundary wall (Feature A), two probable burial mounds (Features B and C), and a burial cave with visible human remains and a ground stone (Feature D). The burials were first addressed on 2 March 1998, in a letter report (E. M. Fredericksen 1998) noting the discovery of additional human remains located in a 7-m long lava tube in a small gully that also contained two probable post-Contact burials.

SIHP # -4516 is interpreted as a pre-Contact agricultural site with five features: a rock wall (Feature A), two terraces (Features B and C), a rock enclosure interpreted as a possible habitation/activity area (Feature D), and a rock alignment (Feature E). Utilized basalt flakes, volcanic glass flakes, and possible quartz flake were encountered at SIHP # -4516.

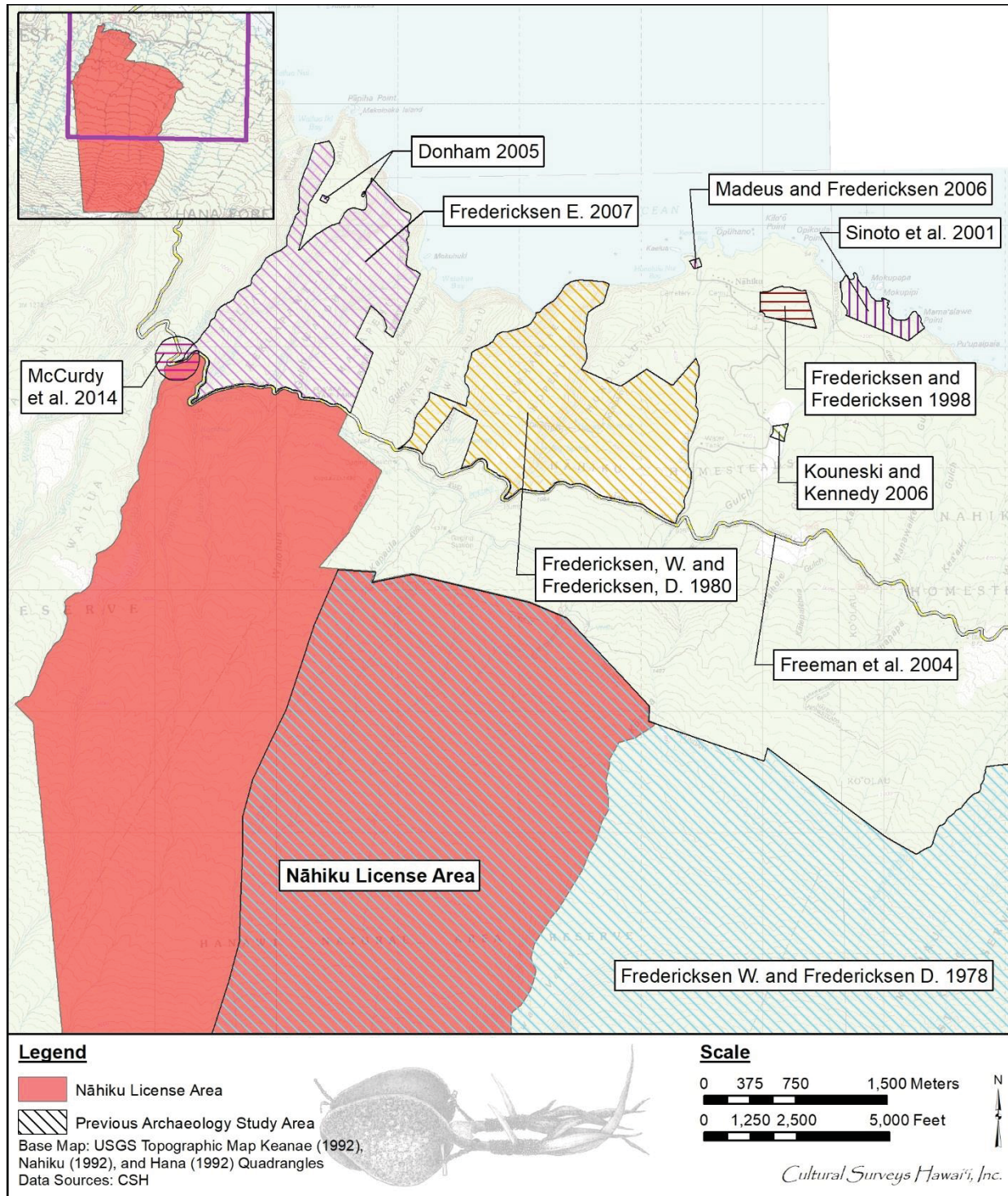


Figure 46. Previous archaeological studies with or near the Nāhiku License Area (U.S. Geological Survey 1991, 1992a, c, d)

Table 11. Previous Archaeological Studies in the Vicinity of the Nāhiku License Area

Reference	Type of Study	Location	Results (SIHP # 50-50-12)
W. M. Fredericksen and Fredericksen (1978)	Archaeological survey	Six power pole sites in a Conservation District in Upper Nāhiku for East Maui Irrigation Company Kuhiwa Well (TMK: [2] 1-2-004:007)	No significant findings
W. M. Fredericksen and Fredericksen (1980)	Report of research	Hanawi Stream (TMK: [2] 1-2-001:001)	Concluded an absence of archaeological features but noted a horse or foot trail, a paved area interpreted as a place for modern temporary gatherings and structural-size stones and 'ili 'ili stones observed along the old Government Road that may or may not have been part of a <i>heiau</i>
(Erik M. Fredericksen and Demaric L. Fredericksen 1998; Erik M. Fredericksen and Demaris L. Fredericksen 1998b)	AIS	26.97 acres in Ko'olau, Hāna District (TMK: [2] 1-2-002:026)	Documented 11 cultural sites including five agriculture and possible habitation sites (SIHP #s 50-50-12-4516 thru -4518, -4522, and -4523); a temporary habitation and agricultural site with burial caves and possible shrine (SIHP # -4514); a site with a boundary wall, burial cave and two probable burial mounds (SIHP # -4515); an agricultural complex with terraces and walls (SIHP # -4519); clear piles (SIHP # -4520); a boundary wall and temporary habitation overhang (SIHP # -4521); and a boundary wall and habitation terraces (SIHP # -4548); confirmed SIHP # -0099, Poho'ula Heiau



Reference	Type of Study	Location	Results (SIHP # 50-50-12)
Sinoto et al. (2001)	AIS	26-acre ocean front parcel (TMK: [2] 1-2-003:021) located between Kuhiwa Gulch and Kahakapuaa Gulch in Nāhiku	Documented SIHP # -5057, a surface scatter of lithics, and two features of SIHP # -5056: a notched heiau (Feature 1) and a small rectangular depression (Feature 2); reported a possible subsurface pit feature containing rocks, boulders, charcoal flecking, and 'opihi shell fragments
Donham (2005)	Archaeological assessment	3.2 acres within TMK: [2] 1-2-001:004, located within Ko'olau Forest Reserve	No significant findings
Kouneski and Kennedy (2006)	Archaeological assessment	2.628-acre parcel in Nahiku Homesteads (TMK: [2] 1-2-002:050)	No significant findings
Madeus and Fredericksen (2006)	AIS	0.84-acre parcel in Nāhiku (TMK: [2] 1-2-001:026)	Documented two features of SIHP # -5961: a small pre-and post-Contact habitation platform (Feature A) and a retaining wall (Feature B)
E. M. Fredericksen (2007)	Archaeological monitoring	Approximately .5 acre at Pua'a Ka'a State Wayside Park (TMK: [2] 1-2-001:003)	No significant findings



At SIHP # -4517, three features were documented: large rock enclosure (Feature A), a terrace (Feature B), and a rock mound and small terrace (Feature C). Several artifacts were observed at this site, including basalt flakes, a basalt core, a utilized possible quartz flake, an adze tip fragment, metal pieces, green glass, clear glass, and ceramic sherds.

SIHP # -4518 is a small agricultural site with three components: two terraces (Features A and B) and a rock clear pile (Feature C). A basalt core and utilized basalt flakes were observed SIHP # -4518.

At SIHP # -4519, a pre-Contact agricultural site, five components were recorded, including two terraces (Features A and B), a pair of parallel rock wall sections (Feature C), a partial rock wall enclosure (Feature D), and a clear pile (Feature E). Two hammerstones, a hand axe, utilized basalt and volcanic glass flakes, an adze fragment, and a pecking stone were encountered at this site.

SIHP # -4520 consists of three rock mound agricultural clear piles (Features A through C). SIHP # -4521 is comprised of a historic boundary wall (Feature A) and a rock overhang used as a temporary shelter during pre- and post-Contact times (Feature B). Cultural materials observed at this site include early twentieth century bottles and ceramics, two basalt cores, a possible hammerstone, and several *'opihi* shells.

SIHP # -4522 is a pre-Contact agricultural site also utilized post-Contact that contains three features: a large terrace with associated retaining wall interpreted as a possible temporary habitation area (Feature A) and two smaller terraces (Features B and C). Artifacts encountered include clear glass, green glass, brown glass, ceramic sherds, a white button fragment, a glass bead, a slate fragment, utilized polished basalt flakes, a retouched adze fragment, and a hammerstone/chopper.

SIHP # -4523 is a small agricultural terrace with a poorly constructed retaining wall and associated volcanic glass debitage, unworked basalt flakes, waterworn pebbles; and a waterworn boulder.

SIHP # -4548 is comprised of a terrace with a retaining wall interpreted as a pre-Contact habitation area also utilized post-Contact (Feature A) and a likely historic, boundary wall (Feature B). Both pre-and post-Contact artifacts were encountered, including utilized basalt flakes and volcanic glass flakes, three pecking stones, three hammerstones, a ground stone, four adze fragments, polished basalt flakes, four slate fragments, a copper button fragment, and a blue glass bead. An *'ili'ili* pavement, a mammal tooth, and shell (*Cellana* sp.) were also encountered subsurface at this site.

#### **2.5.6.4 Sinoto et al. (2001)**

On 6 December and 8 December 2000, Archaeological Services Hawaii, LLC in association with Aki Sinoto Consulting conducted an AIS for a 26-acre ocean front parcel (TMK [2] 1-2-003:021) located between Kuhiwa Gulch and Kahakapuaa Gulch in Nāhiku 'Ili, Ko'olau Moku, Hāna District, which included surface inspection and subsurface testing consisting of seven backhoe trenches (Sinoto et al. 2001). At the surface, two historic properties (SIHP # 50-50-12-5056 and -5057) were documented, consisting of a notched *heiau* (SIHP # -5056 Feature 1), a small rectangular depression (SIHP # -5056 Feature 2), and a surface scatter of lithics (SIHP # -5057). A possible subsurface pit feature containing rocks, boulders, charcoal flecking, and *'opihi* shell fragments was observed in Trench 5.

### **2.5.6.5 Donham (2005)**

On 24 August 2005, Akahahele Archaeology conducted an archeological inventory survey of two proposed areas totaling 3.2 acres within TMK: [2] 1-2-001:004, located in Ko'olau Forest Reserve (Donham 2005). No historic properties or cultural materials were identified; therefore, the study was termed an archaeological assessment.

### **2.5.6.6 Kouneski and Kennedy (2006)**

On 25 January 2006, Archaeological Consultants of the Pacific, Inc. carried out an AIS of a 2.628-acre parcel in Nahiku Homesteads (TMK: [2] 1-2-002:050) (Kouneski and Kennedy 2006). No historic properties were identified during this 100% pedestrian survey, so the study was accepted as an archaeological assessment.

### **2.5.6.7 Madeus and Fredericksen (2006)**

Intermittently from November 2005 through March 2006, Xamanek Researches, LLC conducted an AIS for a 0.84-acre parcel in Nahiku (TMK: [2] 1-2-001:026), consisting of subsurface testing and 100% surface survey (Madeus and Fredericksen 2006). This AIS documented one historic property (SIHP # 50-50-12-5961), which included a small habitation platform (Feature A) and a retaining wall paralleling an access road to Nahiku Landing (Feature B). During subsurface testing, cultural materials were only encountered in the two test excavations near Feature A. The following pre- and post-Contact materials were observed: volcanic glass flakes, basalt flakes, a probable hammerstone, *'opihi* shell fragments, an unidentified shell, charcoal, pieces of porcelain, clear glass fragments, and a white glass button.

### **2.5.6.8 (E. M. Fredericksen 2007)**

In May 2007, Xamanek Researches, LLC monitored excavations for wastewater improvements on approximately 0.5 acre at Pua'a Ka'a State Wayside Park (TMK: [2] 1-2-001:003) (E. M. Fredericksen 2007). No cultural materials were encountered.

## Section 3 Field Inspection

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### 3.1 Field Methods

#### 3.1.1 Pedestrian/Vehicular Inspection

CSH archaeologists Trevor Yucha, B.S. (project manager), Zachariah Royalty, B.S., and Jonas Madeus, B.A. completed a combined pedestrian and vehicular inspection of portions of the License Area between 15 and 18 May 2018 in conjunction with an assessment of the EMI infrastructure conducted by Mason Architects. CSH archaeologists were accompanied by Dee Ruzicka of Mason Architects, CSH cultural advisor, Aulii Mitchell, and CSH cultural researcher, Nicole Ishihara. Fieldwork included the inspection of the License Area's access road network by four-wheel drive vehicle followed by the pedestrian inspection of various ditch trails and the locations surrounding 21 sluice gates throughout the EMI Aqueduct System. The inspection was guided by EMI personnel who provided access through locked gates and navigation of the system.

#### 3.1.2 Fieldwork Documentation

Documentation included descriptions and photographs of any potential findings as well as descriptions of the natural and built environment observed throughout the License Area. Descriptions and photographs were recorded using Apple Ipads equipped with standard digital form software as well as with digital cameras.

#### 3.1.3 GPS Location

A handheld Garmin GPS unit (accuracy +/- 1 m) was used to record points of interest that were then uploaded to ArcGIS for inclusion on project maps.

### 3.2 Laboratory Methods

No material was collected from the License Area during fieldwork, therefore no laboratory analysis was conducted.

### 3.3 Disposition of Materials

All data generated during the archaeological literature review and field inspection are stored at the CSH offices.

### 3.4 Results of Field Inspection

CSH completed an archaeological field inspection between 15 and 18 May 2018 in conjunction with an assessment of the EMI infrastructure conducted by Mason Architects. While the primary focus of the survey was to visit 21 sluice gates along the EMI Aqueduct System for architectural recordation, CSH used the opportunity to inspect portions of the License Area along access roads, ditch trails, and within upland stream valleys (Figure 47). Access to many of these remote areas included a combination of four-wheel drive roads leading from Hāna Highway to the aqueduct system followed by narrow ditch trails and drainages nearest the sluice gates and intakes. The field inspection provided an opportunity to inspect some of the upland areas of the License Area within steep-sided valleys that have not been formally surveyed by archaeologists. No previous



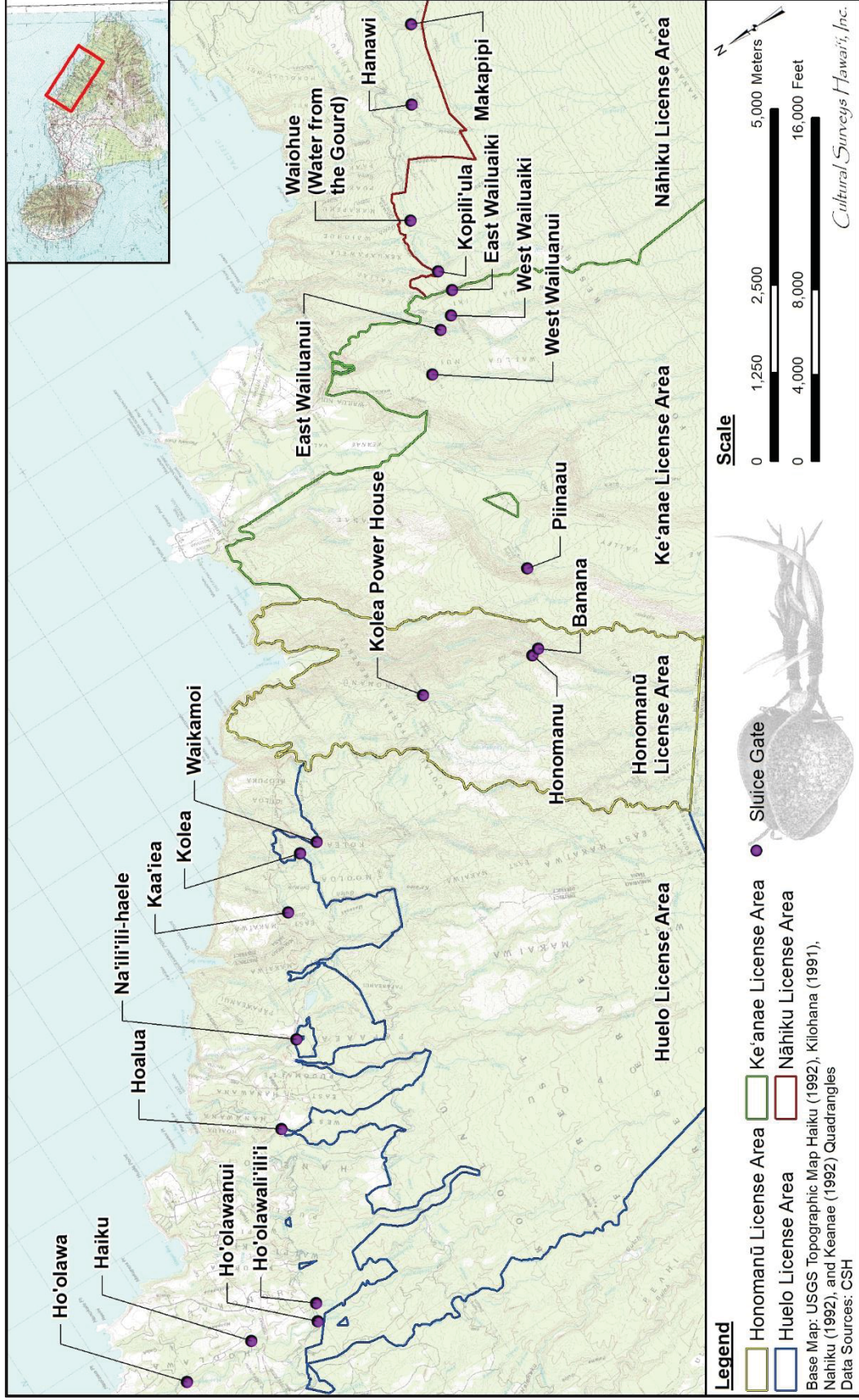


Figure 47. Portions of the Haiku (1992a), Keanae (1992c), Kilohana (1991), Nahiku (1992d), and Hana (1992b) USGS 7.5-minute topographic quadrangles showing the location of the sluice gates visited during the field inspection (note that the field inspection also included the access roads and trails connecting these locations to Hāna Highway)

LRFI for Nāhiku, Ke'anae, Honomanū, and Huelo License Areas, Multiple Ahupua'a, Makawao and Hāna, Maui

TMKs: [2] 1-1 (various plats and parcels), 1-2-004-005, 007 (por.), and 2-9-014:(various parcels)



historic properties have been recorded in these areas, and no potential historic properties, apart from infrastructure related to the EMI Aqueduct System, were observed during the field inspection.

As expected, ground visibility was poor due to thick vegetation cover throughout the License Area. Additionally, in many cases, the terrain on both the upslope and downslope sides of the access roads and trails consisted of nearly vertical valley walls that were inaccessible (Figure 48 through Figure 50). Archaeologists also inspected the areas within the narrow, boulder-filled streambeds that have been cut by centuries of stream flow and rearranged by occasional freshets (Figure 51). These areas consisted of deposits of predominately boulder-sized basalt stone overlying bedrock with little to no soil accumulation. No potential archaeological sites were observed.

As there were no potential archaeological sites observed during the brief field inspection, fieldwork focused on the documentation of the natural and built environment including the EMI Aqueduct System. Documentation included photographs and GPS location of various features of the system including sluice gates, ditches, tunnel openings, access roads, bridges, and meter stations. These structures are built with combinations of locally sourced stone, both cut and natural, that were mortared or dry stacked (Figure 52 through Figure 55). Portions of the ditches were also constructed of formed concrete (Figure 56). Concrete/metal grates, metal walkways, and metal control mechanisms were also observed throughout the system (Figure 57 through Figure 59). Numerous concrete bridges were traversed during the inspection, all of which appear to be of similar construction style and age, with "E.M.I.CO." and the date "1924" inscribed at several locations (Figure 60 through Figure 62). Additional documentation of the infrastructure of the EMI Aqueduct System was recorded by Mason Architects during the study.



Figure 48. General view of the 4WD access road to the Makapipi sluice gate showing vegetation cover, including large quantities of *ti*, view to northeast





Figure 49. General view of the ditch trail in the vicinity of the Banana sluice gate showing the steep terrain above and below the trail as well as the extend of vegetation cover, view to southeast



Figure 50. General view of the surface of the ditch trail in Honomanū Valley that was inspected by archaeologists showing nearly vertical valley walls on the upslope and downslope edges of the trail, view to south





Figure 51. View of archaeologist inspecting the Honomanū Stream bed in the vicinity of the Honomanū sluice gate, view to south



Figure 52. General view of a cut and faced mortared basalt retaining wall located at the West Wailuanui sluice gate, view to northeast





Figure 53. General view of the West Wailuanui diversion dam showing basalt and mortar masonry, view to west





Figure 54. Oblique profile view of a stacked basalt stone wall at the Banana sluice gate, view to south



Figure 55. General view of a stacked basalt stone wall on the western edge of Na'ili'ili Haele Stream and adjacent to a diversion dam, view to west





Figure 56. General view of concrete ditches at the Ho'olawali'ili'i sluice gate, view to south





Figure 57. Close-up view of a concrete grate at the East Wailuanui Iki sluice gate, view to west



Figure 58. General view of a metal walkway above a flume crossing Waiohue Stream, view to southeast





Figure 59. Close-up view of an abandoned iron sluice gate mechanism located along the ditch trail near the Banana sluice gate, view to southeast



Figure 60. General view of the bridge spanning Honomanū Stream showing “1924” inscribed on side, view to south





Figure 61. General view of the bridge over Honomanū Stream showing construction that utilizes a massive boulder, view to northeast

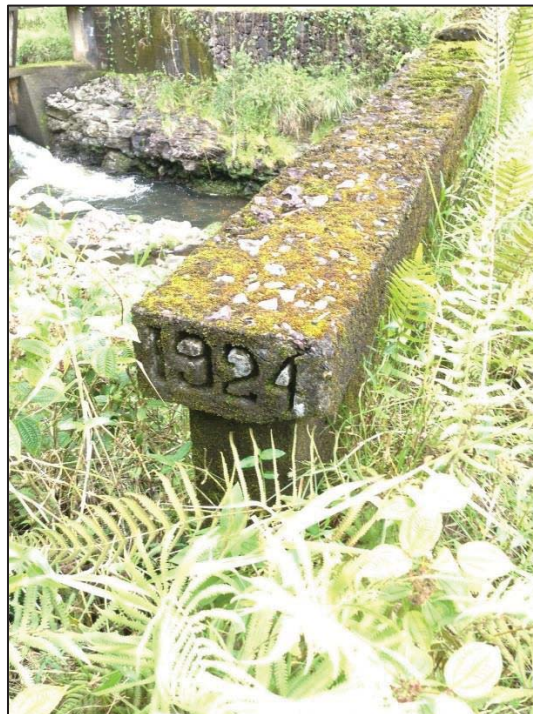


Figure 62. Close-up view of the “1924” date inscription on the bridge nearest to the East Wailua Iki sluice gate, view to west

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## Section 4 Summary, Analysis, and Recommendations

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### 4.1 Summary

At the request of Wilson Okamoto Corporation CSH has prepared this LRFI for the Proposed Lease (Water Lease) for the License Area, which includes the Nāhiku, Ke‘anae, Honomanū, and Huelo License Areas (East Maui Aqueduct System), Multiple Ahupua‘a, Makawao and Hāna District, Maui Island, TMKs: [2] 1-1-001:044, 50, 1-1-002:002, 1-2-004:005, 007 (por.), 2-9-014:001, 005, 011, 012, 017.

This report presented a summary of the environmental setting of the License Area including a discussion of hydrology, rainfall, common vegetation, and soils. The License Area includes 37 named streams, 35 of which have been historically diverted into the EMI Aqueduct System, the focus of the current study. Vegetation within the License Area is categorized as Hawaii Lowland Rainforest and Hawaiian Introduced Wet Mesic Forest and includes a mix of exotic (non-native) and exotic and Polynesian cultigens (Giambelluca et al. 2014). Soils within the License Area are predominated by silty clays that have developed in this steep mountainous region and within stream valleys. The built environment of the License Area includes the EMI Aqueduct System comprised of numerous tunnels, ditches, siphons, intakes, and reservoirs. Additionally, the northern boundary of the License Area is generally bounded by the Hāna Highway that includes 56 bridges or culverts that are located adjacent to the License Area. Several coastal communities are located on the seaward side of Hāna Highway and outside of the current License Area.

Traditional background research included a review of place names, legendary accounts, and documentation of pre-Contact land use within Hāmākua Loa Moku and Ko‘olau Moku. The more than 150 place names gathered and translated during the study highlight the abundance of resources in the region and associations with past cultural practices and land use. Additional documentation of the traditional background of the area included details of a legendary shore visit to Hāmākua Loa from the gods Kāne and Kanaloa, the special significance of the deep valleys and inland forests of the region, the history of the construction of the *alahahele* and *alaloo*, a summary of the 39 recorded *heiau* in the region, and testimony describing the abundance of agriculture and other resources that supported a thriving pre-Contact population in East Maui.

Early historic background research presented a regional perspective of the earliest Western accounts recorded in East Maui including Captain James Cook’s brief stop at Hāna in 1778, the arrival of the British ship, the *Iphigenia* at Hāna in 1788, the role of East Maui in the 1790 *Kaua o Kawa‘anui* (Battle of Great Canoes), and the arrival of the first missionaries to East Maui in the early 1800s.

Documentation collected during The Māhele of 1848 provides information on the types and locations of terrestrial and marine resources in the region including agricultural plots, fishing grounds, naturally occurring plant resources, and water supply. Historic maps and claimant records were used to map the location of known LCA awards located in the vicinity of the License Area. The Māhele also marked a turning point in Hawai‘i’s history as Western commercial interests and travelers began their influence on the remote region of East Maui and elsewhere. One of the earliest effects, was the proliferation of Old World diseases. A review of early newspapers throughout the state documented outbreaks of influenza and smallpox specific to portions of East Maui.



The earliest records of Western industry in East Maui included L. L. Torbert's potato plantation at Honua'ula and the beginning of the construction of ditches, tunnels, and siphons to transport the waters of East Maui to the central isthmus for commercial sugarcane agriculture. On 30 September 1876, the government of Hawai'i gave permission to the plantations of Maui to take water from the principal six streams of the region and convey the water by ditch to their fields, for an annual rental of \$100 (Kuykendall 1967:64). The project was completed on schedule and, in July 1877, the first water began flowing through the ditch to the Haiku Plantation. The transfer of water sparked the rise of the commercial sugar industry on Maui and prompted the expansion of the EMI Aqueduct System to include a present-day estimate of 50 miles of tunnels, 24 miles of ditches, inverted siphons and flumes, 388 intakes, eight reservoirs, 62 miles of private roads, and a solar-powered radio telemetry system to monitor ditch flows (ASCE 2001).

The changes that were underway in East Maui at the turn of the century are poetically captured in an excerpt from a 19 December 1898 article in *The Hawaiian Star* documenting a large land sale in Nāhiku:

The district, one of the most fertile on the Islands, awakes out of its lethargy. The valleys which have only heard the roar of the cataract and the rush of the stream will wake to the sound of the steam whistle and the ax, and man will enter upon his kingdom. Cultivation and civilization will reign, but the wild beauty of the Koolau district will be gone. Again this is progress under annexation. (*The Hawaiian Star* 1898)

Rubber plantations in portions of East Maui soon followed sugar with the start of the Nāhiku Rubber Company, Koolau Rubber Company, American-Hawaiian Rubber Company, and the planting of rubber by the Nāhiku Sugar Company throughout the early 1900s. Ultimately a decline in the price of rubber doomed the Maui rubber industry. After testing for several years, the rubber growers concluded that it would not be profitable to continue. It was found that the temperature was hardly warm enough for rubber to grow best and that labor was much more expensive than at Malaysian plantations (O. W. Freeman 1927:64).

Additional research into the history of East Maui included a summary of the development of the community of Ke'anae, the construction of the Hāna Belt Road and subsequent designation of the corridor as an historic district, and a review of modern land use in the region focused on the activities of the more than 700,000 tourists that travel annually throughout this region.

Previous archaeological research included a summary of approximately 45 archaeological studies conducted in the vicinity of the current License Area including early island-wide surveys, studies specific to the Hāna Highway, and studies conducted in the vicinity of each license area. In general, these studies document the rich archaeological landscape along the coast of the region and extending upward into many of the stream valleys. Findings include agricultural complexes, habitation areas, *heiau*, trails, walls, historic structures and remnants, WWII-era structures, and other associated artifacts and deposits. Few of these previous studies are within or overlap with the current License Area.

CSH completed an archaeological field inspection between 15 and 18 May 2018 in conjunction with an assessment of the EMI infrastructure conducted by Mason Architects. While the primary focus of the survey was to visit 21 sluice gates along the EMI Aqueduct System for architectural recordation, CSH used the opportunity to inspect portions of the lease area along access roads,

ditch trails, and within upland stream valleys. The field inspection provided an opportunity to inspect some of the upland areas of the License Area within steep-sided valleys that have not been formally surveyed by archaeologists. As expected, ground visibility was poor due to thick vegetation cover throughout the License Area. Additionally, in many cases, the terrain on both the upslope and downslope sides of the access roads and trails consisted of nearly vertical valley walls that were inaccessible. No potential archaeological sites were observed.

As there were no potential archaeological sites observed during the brief field inspection, fieldwork focused on the documentation of the natural and built environment including the EMI Aqueduct System. Documentation included photographs and GPS location of various features of the system including sluice gates, ditches, tunnel openings, access roads, bridges, and meter stations.

## 4.2 Analysis and Recommendations

### 4.2.1 Defining Project Impacts

As defined by HAR§ 13-284-7(2)(b), effects or impacts of a project on significant historic properties “include, but are not limited to, partial or total destruction or alteration of the historic property, detrimental alteration of the properties’ surrounding environment, detrimental visual, spatial, noise or atmospheric impingement, increasing access with chance of resulting damage, and neglect resulting in deterioration or destruction.” These effects are generally considered in terms of direct and indirect impacts. Potential impacts to archaeological historic properties as a result of the Proposed Action and alternatives are discussed and based on the research conducted during this LRFI. As there were no archaeological historic properties identified during this study within the License Area, effects to specific significant historic properties are not presented.

### 4.2.2 Proposed Action

The Proposed Action constitutes the issuance of one long term (30 years) Water Lease from the BLNR for the continued *“right, privilege, and authority to enter and go upon”* the License Area for the *“purpose of developing, diverting, transporting, and using government owned waters”* through the existing EMI Aqueduct System which supplies water to domestic and agricultural water users. The Water Lease will enable the lessee to continue to go on lands owned by the State in order to maintain and repair existing access roads and trails used as part of the EMI Aqueduct System, and will allow continued operation of the EMI Aqueduct System to deliver water to the County of Maui DWS for domestic and agricultural water needs in Upcountry Maui, including the agricultural users as the Kula Agricultural Park (KAP), as well as for the Nāhiku community. It will also allow the continued provision of water to approximately 30,000 acres of agricultural lands in Central Maui. The proposed action is subject to the terms of the Interim Instream Flow Standard (IIFS) established by the Commission on Water Resource Management.

In their 6 October 2017 Chapter 6E-8 historic preservation review letter (Log No. 2017.00026; Doc. No: 1706MBF11), the SHPD states that “the proposed water lease will not involve any ground disturbance, and that the potential impact of flooding from abandoning the diversions on five of the streams will not be greater than periodic naturally occurring events”.

The Proposed Action will not include partial or total destruction or alteration of historic properties, detrimental alteration of the surrounding environment, detrimental visual, spatial, noise

or atmospheric impingement, increasing access with chance of resulting damage, nor neglect resulting in deterioration or destruction. The Proposed Action does not include project-related ground disturbance or changes in water flow greater than periodic natural stream freshets. As such, the Proposed Action will have no impact to archaeological historic properties.

#### **4.2.3 No Action Alternative**

The No Action alternative is understood as the termination or non-issuance of the subject Water Lease (described in Section 4.2.1). Under this alternative, A&B would be permitted to 30% of the water from the larger 50,000-acre Collection Area based on previous agreements.

If the No Action alternative includes the continued maintenance and repair of the existing EMI Aqueduct System regardless of the issuance of the subject Water Lease, then the No Action alternative will not include partial or total destruction or alteration of historic properties, detrimental alteration of the surrounding environment, detrimental visual, spatial, noise or atmospheric impingement, increasing access with chance of resulting damage, nor neglect resulting in deterioration or destruction. Therefore, the No Action alternative with continued maintenance will have no impact to archaeological historic properties.

If the No Action alternative does not include continued maintenance and repair of the existing EMI Aqueduct System, then the No Action alternative has the potential to pose an impact to historic properties. Components of the EMI Aqueduct System that deteriorate and begin to fail, such as broken ditch walls or collapsed tunnels, have the potential to alter natural drainage patterns and increase erosion in downstream areas that are outside of established stream channels. These areas have the potential to contain surface and subsurface historic properties that could be affected by flooding and erosion. As an architectural resource, the EMI Aqueduct System would also be affected by “neglect resulting in deterioration or destruction” if maintenance and repair of the system are discontinued.

#### **4.2.4 Water Sources Alternative**

The Water Sources alternative is understood as the decision to obtain water from new sources other than from the diversion of East Maui streams into the existing EMI Aqueduct System. These sources could include new wells, desalinization facilities, and reservoirs located on Maui Island.

The construction of new wells, desalinization facilities, and reservoirs is assumed to include some level of project-related ground disturbance on Maui Island. Project-related ground disturbance has the potential to include partial or total destruction or alteration of historic properties, detrimental alteration of the surrounding environment, and/or detrimental visual, spatial, noise or atmospheric impingement. Therefore, the Water Sources alternative has the potential to impact historic properties that may be located within the footprint of new wells, desalinization facilities, and reservoirs. Prior to construction, consultation with the SHPD is recommended in order to determine the appropriate historic preservation requirements for the construction of new wells, desalinization facilities, and reservoirs.

#### **4.2.5 Water Lease Volume Alternative**

The Water Lease Volume alternative is understood as a modification (reduction) to the volume of water that is diverted from East Maui streams.



A reduction in the volume of water diverted from East Maui streams will not include partial or total destruction or alteration of historic properties, detrimental alteration of the surrounding environment, detrimental visual, spatial, noise or atmospheric impingement, increasing access with chance of resulting damage, nor neglect resulting in deterioration or destruction. As such, the Water Lease Volume alternative will have no impact to archaeological historic properties.

#### **4.2.6 Lease Terms Alternative**

The Lease Terms alternative is understood as a modification to the length of the proposed lease term for the “*right, privilege, and authority to enter and go upon*” the Nāhiku, Ke‘anae, Honomanū, and Huelo License Areas for the “*purpose of developing, diverting, transporting, and using government owned waters* through the existing EMI Aqueduct System. The Proposed Action constitutes the issuance of one long term (30 years) Water Lease, and this alternative considers either a shorter or longer lease term.

The duration of the Water Lease will not necessarily include partial or total destruction or alteration of historic properties, detrimental alteration of the surrounding environment, detrimental visual, spatial, noise or atmospheric impingement, increasing access with chance of resulting damage, nor neglect resulting in deterioration or destruction. As such, the Lease Terms alternative will have no impact to archaeological historic properties.

#### **4.2.7 Management Alternative**

The Management alternative is understood as a change of the entity that manages the diversion of water from East Maui streams.

A change in management will not include partial or total destruction or alteration of historic properties, detrimental alteration of the surrounding environment, detrimental visual, spatial, noise or atmospheric impingement, increasing access with chance of resulting damage, nor neglect resulting in deterioration or destruction. As such, the Management alternative will have no impact to archaeological historic properties.

#### **4.2.8 Public Access**

An increase in unmanaged public access to the License Area, or any part thereof, as part of any proposed project alternative is identified as having the potential to impact historic properties. Potential impacts from unmanaged access could include looting and “rock-robbing” of surface and subsurface historic properties, littering, harvesting of archaeologically associated flora such as *ti* (*Cordyline fruticosa*), trampling or erosion from pedestrian/vehicular access, and unpermitted ground disturbance. Consultation with the SHPD is recommended in order to determine the appropriate historic preservation requirements if project alternatives are selected that present an increase in vehicular/pedestrian traffic or uncontrolled public access within the License Area.

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# Appendix A SHPD Correspondence



**STATE OF HAWAII**  
**DEPARTMENT OF LAND AND NATURAL RESOURCES**  
 STATE HISTORIC PRESERVATION DIVISION  
 KAKUHIHEWA BUILDING  
 601 KAMOKILA BLVD, STE 555  
 KAPOLEI, HAWAII 96707

SUZANNE D. CASE  
CHAIRPERSON  
 BOARD OF LAND AND NATURAL RESOURCES  
 COMMISSION ON WATER RESOURCE MANAGEMENT

KEKO A KALUHIWA  
FIRST DEPUTY

JEFFREY T. PEARSON  
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES  
 BOATING AND OCEAN RECREATION  
 BUREAU OF CONVEYANCES  
 COMMISSION ON WATER RESOURCE MANAGEMENT  
 CONSERVATION AND COASTAL LANDS  
 CONSERVATION AND RESOURCES ENFORCEMENT  
 ENGINEERING  
 FORESTRY AND WILDLIFE  
 HISTORIC PRESERVATION  
 KAHOOHAWE ISLAND RESERVE COMMISSION  
 LAND  
 STATE PARKS

January 25, 2017

Russell Y. Tsuji, Administrator  
 Land Division  
 Department of Land and Natural Resources  
 P. O. Box 621  
 Honolulu, HI 96809

Dear Mr. Tsuji:

**SUBJECT: Chapter 6E-7 and 6E-42 Historic Preservation Review –  
 Environmental Impact Statement Preparation Notice for Proposed Lease for the  
 Nahiku, Keanae, Honomanu and Huelo License Areas  
 East, Central and Up County Maui (EMI Aqueduct System)  
 Keanae, Ko'olau, Honomanu, East Makaiwa, Honopu, Papa'a'ea, Waipionui, Waipioki Ahupua'a,  
 Ko'olau, Hamakualoa, Honopu, Mokupapa, and West Makaiwa District, Island of Maui  
 TMKs: (2) 1-1-001:044, 050, 1-1-002:002, 1-2-004: 005, 007**

Thank you for the opportunity to comment on the proposed Environmental Impact Statement Preparation Notice (EISP) (Wilson Okamoto Corporation, January 2017) for the proposed lease of the Nāhiku, Keanae, Honomanu, and Huelo License Areas by Alexander and Baldwin, Inc. and East Maui Irrigation Company, Limited (A&B). SHPD received this submittal on December 2, 2016 (Log No. 2016.02785) and again on January 5, 2017 (Log No. 2017.00026). The proposed water lease will encompass approximately 33,000 acres of State owned lands spanning through the Ko'olau Natural Area Reserve, Conservation lands and undeveloped lands. The applicant, A&B, seeks a long-term 30-year lease for the right, privilege, and authority to enter and go upon State owned lands (Nahiku, Keanae, Honomanu and Huelo license areas) for the purpose of developing, diverting, transporting, and using government-owned waters; including the right to maintain and repair existing access roads and trails used in connection with the privately owned water aqueduct system. The submittal indicates that the purpose and need for the water lease is to continue service for agricultural and domestic purposes, and to continue cultivation of naturally non-arable lands in Central Maui.

According to the submittal there are 39 identified streams within the Nāhiku, Keanae, Honomanu, and Huelo License Areas and one waterfall on the Wailuanui Stream. Of these 39 streams and 1 waterfall, A&B has historically operated diversions on 36 streams, and is in the process of abandoning all of its diversions on 5 of those 36 streams. These five streams include East and West Wailuanui, Palauhulu, Pi'ina'au, Pualoa/Hanehoi and Honopou Streams.

A SHPD records review indicates that numerous archaeological and cultural sites were identified in *A Cultural Landscape Study of Ke'anae and Wailuanui for the County of Maui, Planning Department* (Group 70 International, Cultural Surveys Hawaii, Inc., Davianna McGregor, PhD, July 1995) and in *East Maui Resource Inventory* (NPS, Rivers Trails, and Conservation Assistance Program, February 1998). The East Maui Irrigation Company Ditches (SHIP 50-50-07-1508) includes 24 miles of ditches, 50 miles of tunnels, various flumes, weirs, aqueducts, small dams, and intakes. The construction of these ditches, tunnels and aqueducts began in 1876 and was completed in 1923. The Hāmākua Ditch completed in 1878; Ha'ikū Ditch constructed in 1879; Manuel Luis Ditch completed in 1900; Ko'olau Ditch completed in 1904; New Ha'ikū Ditch completed in 1914; and the Wailoa Ditch which was the last ditch to be completed, in 1923.



Mr. Tsuji  
January 25, 2017  
Page 2

At this time SHPD is unable to make a determination on the potential impact to historic properties by the requested issuance of a long-term lease.

Pursuant to HAR §13-284-5(b)(5)(A and C), SHPD requests the following prior to issuance of the lease:

- 1) An archaeological inventory survey, and
- 2) An architectural inventory survey

Pursuant to HAR §13-284-5(c), SHPD also requests the following due to the expansive size of the project area and the complexity of the irrigation system:

- (1) An inventory plan for the archaeological inventory survey, and
- (2) An inventory plan for the architectural inventory survey

The archaeological inventory survey shall be conducted by a qualified archaeologist in order to adequately identify and document any archaeological historic properties that may be present, to assess their significance, to determine the potential impacts of this project on any identified archaeological historic properties, and to identify and ensure appropriate mitigation is implemented, if needed. A list of permitted archaeological firms is provided on the SHPD website at: <http://dlnr.hawaii.gov/shpd/about/branches/archaeology/>.

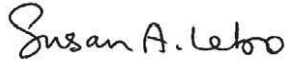
The architectural inventory survey shall be conducted by a qualified architectural historian or historic architect in compliance with the Secretary of the Interior's Professional Qualifications Standards.

SHPD also requests the landowner, project proponent and/or representative, archaeological firm, and architectural firm consult with our office regarding development of the AIS plans.

SHPD will notify you when the required reports and/or plans have been reviewed and accepted and permit issuance may proceed.

Please contact Anna Broverman, Architectural Historian, at (808) 692-8208 or at [Anna.E.Broverman@hawaii.gov](mailto:Anna.E.Broverman@hawaii.gov) for questions regarding architectural resources. Please me at [Susan.A.Lebo@hawaii.gov](mailto:Susan.A.Lebo@hawaii.gov) or at (808) 692-8019 for any questions regarding archaeological resources or this letter.

Aloha,



Susan A. Lebo, PhD  
Archaeology Branch Chief

cc: Dean D. Uyeno, [Dean.D.Uyeno@hawaii.gov](mailto:Dean.D.Uyeno@hawaii.gov)  
Lydia M. Morikawa, [Lydia.M.Morikawa@hawaii.gov](mailto:Lydia.M.Morikawa@hawaii.gov)  
Keola Cheng, [WOC@wilsonokamoto.com](mailto:WOC@wilsonokamoto.com)



DAVID Y. IGE  
GOVERNOR OF HAWAII



STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION  
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ENGINEERING  
FORESTRY AND WILDLIFE  
HISTORIC PRESERVATION  
KAHOOLAWE LAND RESERVE COMMISSION  
LAND  
STATE PARKS

October 6, 2017

Russell Y. Tsuji, Administrator  
Land Division  
Department of Land and Natural Resources  
P.O. Box 621  
Honolulu, HI 96809

IN REPLY REFER TO:  
Log No. 2017.00026  
Doc. No. 1706MBF11  
Archaeology

Dear Mr. Tsuji:

**SUBJECT: Chapter 6E-8 Historic Preservation Review –  
DLNR Land Division Request Regarding Historic Properties Concerns Related to  
Environmental Impact Statement Preparation Notice for Proposed Lease for the  
Nāhiku, Keanae, Honomanu and Huelo License Areas  
East, Central and Up County Maui (EMI Aqueduct System)  
Keanae, Ko'olau, Honomanu, East Makaiwa, Honopu, Papa'a'ea,  
Waipionui, Waipioki Ahupua'a, Ko'olau, Hamakualoa, Honopu, Mokupapa, and  
West Makaiwa District, Island of Maui  
TMKs: (2) 1-1-001:044, 050, (2) 1-1-002:002, (2) 1-2-004:005, 007**

This letter updates our earlier correspondence dated January 25, 2017 regarding the proposed Environmental Impact Statement (EIS) being prepared in support of the proposed issuance of a State lease to Alexander and Baldwin, Inc. and East Maui Irrigation Company, Limited (A&B) for the Nāhiku, Keanae, Honomanu, and Huelo License Areas. This update reflects additional information SHPD received during several consultations with the applicant and other interested parties.

The SHPD received the original submittal requesting early consultation on the preparation of an EIS on December 2, 2016 (Log No. 2016.02785) and a second request for SHPD comments from the Department of Land and Natural Resources, Land Division (DLNR Land Division) on January 5, 2017 (Log No. 2017.00026). The SHPD commented on the latter, requesting both archaeological and architectural inventory surveys (January 25, 2017; Log No. 2017.00026, Doc. No. 1701GC08).

The proposed State water lease will encompass approximately 33,000 acres of State-owned lands spanning through the Ko'olau Natural Area Reserve, Conservation lands, and undeveloped lands. The applicant, A&B, seeks a long-term 30-year lease for the right, privilege, and authority to enter and go upon State owned lands (Nāhiku, Keanae, Honomanu and Huelo license areas) for developing, diverting, transporting, and using government-owned waters.

According to the submittal there are thirty-nine identified streams within the Nāhiku, Keanae, Honomanu, and Huelo License Areas and one waterfall on the Wailuanui Stream. Of these thirty-nine streams and one waterfall, A&B has historically operated diversions on thirty-six streams, and is in the process of abandoning all of its diversions on five of those thirty-six streams. These five streams include East and West Wailuanui, Palauhulu, Pi'ina'au, Pualoa/Hanehoi and Honopou Streams.

The additional information indicates that the proposed water lease will not involve any ground disturbance, and that the potential impact of flooding from abandoning the diversions on five of the streams will not be greater than periodic naturally occurring events. Therefore, the SHPD **no longer requests an archaeological inventory survey plan**

Mr. Tsuji  
October 6, 2017  
Page 2

**(AISP) or archaeological inventory survey (AIS) be completed** in the project area in conjunction with the proposed lease.

If historic properties such as lava tube openings, concentrations of artifacts, structural remains or human skeletal remains are found during construction activities please cease work in the immediate vicinity of the find, protect the find from additional disturbance, and contact the State Historic Preservation Division, Maui Office, at (808) 243-1285.

Please contact Dr. Matthew Fariss, Maui Lead Archaeologist, at (808) 243-4626 or at [Matthew.B.Fariss@hawaii.gov](mailto:Matthew.B.Fariss@hawaii.gov) for any questions regarding this letter.

Aloha,



Alan S. Downer, PhD  
Administrator, State Historic Preservation Division  
Deputy State Historic Preservation Officer

cc: Dean D. Uyeno, [Dean.D.Uyeno@hawaii.gov](mailto:Dean.D.Uyeno@hawaii.gov)  
Lydia M. Morikawa, [Lydia.M.Morikawa@hawaii.gov](mailto:Lydia.M.Morikawa@hawaii.gov)  
Keola Cheng, [WOC@wilsonokamoto.com](mailto:WOC@wilsonokamoto.com)  
David Shideler, [Dshideler@culturalsurveys.com](mailto:Dshideler@culturalsurveys.com)